FCC Test Report

FCC ID	:	**UIDGPW2200**
Equipment	:	**G.hn Powerline to Wi-Fi extender**
Model No.	:	**GPW2200**
Brand Name	:	**ARRIS**
Applicant	:	**ARRIS Group, Inc.**
Address	:	**3871 Lakefield Drive, Suite 300, Suwanee, Georgia 30024, United States**
Standard	:	**47 CFR FCC Part 15.247**
Received Date	:	**Aug. 28, 2017**
Tested Date	:	**Sep. 01 ~ Sep. 28, 2017**

We, International Certification Corp., would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It may be duplicated completely for legal use with the approval of the applicant. It shall not be reproduced except in full without the written approval of our laboratory.

Reviewed by: **Approved by:**

Along Chen / Assistant Manager **Gary Chang / Manager**

Testing Laboratory 2732

Table of Contents

Release Record

Report No.	Version	Description	Issued Date
FR782803AC	Rev. 01	Initial issue	Nov. 09, 2017

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	[dBuV]: 0.294MHz 27.82 (Margin -22.59dB) - AV	Pass
15.247(d) 15.209	Radiated Emissions	[dBuV/m at 3m]: 4824.00MHz 53.70 (Margin -0.30dB) - AV	Pass
15.247(b)(3)	Maximum Output Power	Max Power [dBm]: 28.46	Pass
15.247(a)(2)	6dB Bandwidth	Meet the requirement of limit	Pass
15.247(e)	Power Spectral Density	Meet the requirement of limit	Pass
15.203	Antenna Requirement	Meet the requirement of limit	Pass

1 General Description

1.1 Information

1.1.1 Specification of the Equipment under Test (EUT)

RF General Information					
Frequency Range (MHz)	**IEEE Std. 802.11**	**Ch. Freq. (MHz)**	**Channel Number**	**Transmit Chains (N_{TX})**	**Data Rate / MCS**
2400-2483.5	b	2412-2462	1-11 [11]	2	1-11 Mbps
2400-2483.5	g	2412-2462	1-11 [11]	2	6-54 Mbps
2400-2483.5	n (HT20)	2412-2462	1-11 [11]	2	MCS 0-15
2400-2483.5	n (HT40)	2422-2452	3-9 [7]	2	MCS 0-15
Note 1: RF output power specifies that Maximum Peak Conducted Output Power. Note 2: 802.11b uses a combination of DSSS-DBPSK, DQPSK, CCK modulation. Note 3: 802.11g/n uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.					

1.1.2 Antenna Details

Ant. No.	**Model**	**Type**	**Connector**	**Operating Frequencies (MHz) / Antenna Gain (dBi)**		
				2400~2483.5	**5150~5250**	**5725~5850**
1	Ant 1	Dipole	UFL	3.46	3.14	3.41
2	Ant 2	Dipole	UFL	2.43	3.25	2.6

1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	100-240Vac

1.1.4 Accessories

Accessories		
No.	**Equipment**	**Description**
1	RJ45 cable	2.0m non-shielded without core

1.1.5 Channel List

Frequency band (MHz)		2400~2483.5	
802.11 b / g / n HT20		802.11n HT40	
Channel	Frequency(MHz)	Channel	Frequency(MHz)
1	2412	3	2422
2	2417	4	2427
3	2422	5	2432
4	2427	6	2437
5	2432	7	2442
6	2437	8	2447
7	2442	9	2452
8	2447	---	---
9	2452	---	---
10	2457	---	---
11	2462	---	---

1.1.6 Test Tool and Duty Cycle

Test Tool	Putty, version: 0.6		
Duty Cycle and Duty Factor	Mode	Duty cycle (%)	Duty factor (dB)
	11b	100.00%	0.00
	11g	88.64%	0.52
	HT20	87.98%	0.56
	HT40	77.57%	1.10

1.1.7 Power Setting

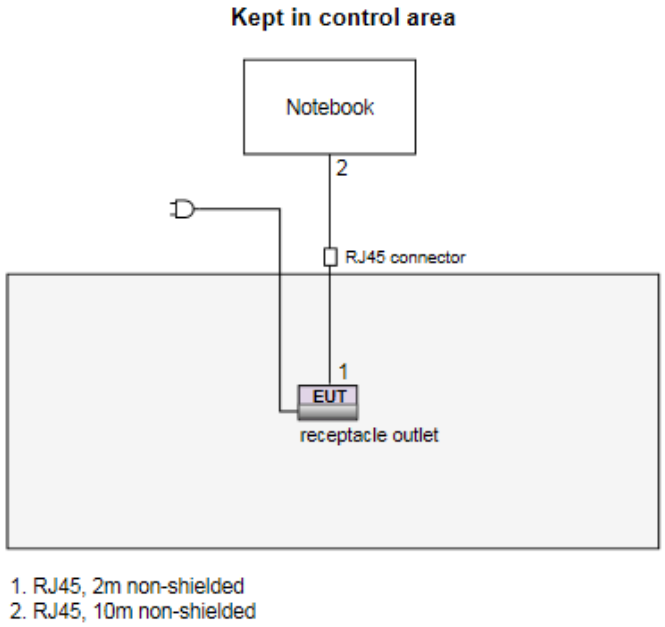
Modulation Mode	Test Frequency (MHz)	Power Set
11b	2412	12/12
11b	2437	11/11
11b	2462	12/12
11g	2412	10/10
11g	2437	25/25
11g	2462	11/11
HT20	2412	8/8
HT20	2437	25/25
HT20	2462	10/10
HT40	2422	2/2
HT40	2437	13/13
HT40	2452	6/6

1.2 Local Support Equipment List

Support Equipment List					
No.	**Equipment**	**Brand**	**Model**	**FCC ID**	**Signal cable / Length (m)**
1	Notebook	DELL	Latitude E6440	DoC	RJ45, 10m non-shielded.

1.3 Test Setup Chart

Test Setup Diagram



1. RJ45, 2m non-shielded
2. RJ45, 10m non-shielded

1.4 The Equipment List

Test Item	Conducted Emission				
Test Site	Conduction room 1 / (CO01-WS)				
Tested Date	Sep. 28, 2017				
Instrument	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Receiver	R&S	ESR3	101657	Dec. 21, 2016	Dec. 20, 2017
LISN	SCHWARZBECK	Schwarzbeck 8127	8127-667	Nov. 08, 2016	Nov. 07, 2017
RF Cable-CON	EMC	EMCCFD300-BM-BM-6000	50821	Dec. 20, 2016	Dec. 19, 2017
Measurement Software	AUDIX	e3	6.120210k	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	Radiated Emission				
Test Site	966 chamber 3 / (03CH03-WS)				
Tested Date	Sep. 01, 2017				
Instrument	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Spectrum Analyzer	ROHDE&SCHWARZ	FSV40	101486	Nov. 15, 2016	Nov. 14, 2017
Receiver	Agilent	N9038A	MY53290044	Oct. 06, 2016	Oct. 05, 2017
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-685	Apr. 28, 2017	Apr. 27, 2018
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1206	Feb. 09, 2017	Feb. 08, 2018
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Oct. 25, 2016	Oct. 24, 2017
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 10, 2016	Nov. 09, 2017
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Dec. 09, 2016	Dec. 08, 2017
Preamplifier	EMC	EMC02325	980187	Sep. 08, 2016	Sep. 07, 2017
Preamplifier	Agilent	83017A	MY53270014	Aug. 21, 2017	Aug. 20, 2018
Preamplifier	EMC	EMC184045B	980192	Aug. 22, 2017	Aug. 21, 2018
RF cable-3M	HUBER+SUHNER	SUCOFLEX104	MY22620/4	Feb. 04, 2017	Feb. 03, 2018
RF cable-8M	HUBER+SUHNER	SUCOFLEX104	MY22600/4	Feb. 04, 2017	Feb. 03, 2018
RF cable-1M	HUBER+SUHNER	SUCOFLEX104	MY22624/4	Feb. 04, 2017	Feb. 03, 2018
LF cable-0.8M	EMC	EMC8D-NM-NM-800	EMC8D-NM-NM-800-001	Feb. 04, 2017	Feb. 03, 2018
LF cable-3M	EMC	EMC8D-NM-NM-3000	131103	Feb. 04, 2017	Feb. 03, 2018
LF cable-13M	EMC	EMC8D-NM-NM-13000	131104	Feb. 04, 2017	Feb. 03, 2018
Measurement Software	AUDIX	e3	6.120210g	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	Radiated Emission				
Test Site	966 chamber 3 / (03CH03-WS)				
Tested Date	Sep. 26, 2017				
Instrument	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Spectrum Analyzer	ROHDE&SCHWARZ	FSV40	101486	Nov. 15, 2016	Nov. 14, 2017
Receiver	Agilent	N9038A	MY53290044	Oct. 06, 2016	Oct. 05, 2017
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-685	Apr. 28, 2017	Apr. 27, 2018
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1206	Feb. 09, 2017	Feb. 08, 2018
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Oct. 25, 2016	Oct. 24, 2017
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 10, 2016	Nov. 09, 2017
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Dec. 09, 2016	Dec. 08, 2017
Preamplifier	EMC	EMC02325	980187	Sep. 04, 2017	Sep. 03, 2018
Preamplifier	Agilent	83017A	MY53270014	Aug. 21, 2017	Aug. 20, 2018
Preamplifier	EMC	EMC184045B	980192	Aug. 22, 2017	Aug. 21, 2018
RF cable-3M	HUBER+SUHNER	SUCOFLEX104	MY22620/4	Feb. 04, 2017	Feb. 03, 2018
RF cable-8M	HUBER+SUHNER	SUCOFLEX104	MY22600/4	Feb. 04, 2017	Feb. 03, 2018
RF cable-1M	HUBER+SUHNER	SUCOFLEX104	MY22624/4	Feb. 04, 2017	Feb. 03, 2018
LF cable-0.8M	EMC	EMC8D-NM-NM-800	EMC8D-NM-NM-800-001	Feb. 04, 2017	Feb. 03, 2018
LF cable-3M	EMC	EMC8D-NM-NM-3000	131103	Feb. 04, 2017	Feb. 03, 2018
LF cable-13M	EMC	EMC8D-NM-NM-13000	131104	Feb. 04, 2017	Feb. 03, 2018
Measurement Software	AUDIX	e3	6.120210g	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	RF Conducted				
Test Site	(TH01-WS)				
Tested Date	Sep. 20 ~ Sep. 26, 2017				
Instrument	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Spectrum Analyzer	R&S	FSV40	101063	Mar. 15, 2017	Mar. 14, 2018
Power Meter	Anritsu	ML2495A	1241002	Oct. 06, 2016	Oct. 05, 2017
Power Sensor	Anritsu	MA2411B	1207366	Oct. 06, 2016	Oct. 05, 2017
AC POWER SOURCE	APC	AFC-500W	F312060012	Oct. 28, 2016	Oct. 27, 2017
Measurement Software	Sporton	Sporton_1	1.3.30	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

1.5 Test Standards

According to the specification of EUT, the EUT must comply with following standards and KDB documents.

47 CFR FCC Part 15.247
ANSI C63.10-2013
FCC KDB 558074 D01 DTS Meas Guidance v04
FCC KDB 662911 D01 Multiple Transmitter Output v02r01

1.6 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)

Measurement Uncertainty	
Parameters	**Uncertainty**
Bandwidth	±34.134 Hz
Conducted power	±0.808 dB
Power density	±0.463 dB
Conducted emission	±2.670 dB
AC conducted emission	±2.90 dB
Radiated emission ≤ 1GHz	±3.66 dB
Radiated emission > 1GHz	±5.37 dB

2 Test Configuration

2.1 Testing Condition

Test Item	Test Site	Ambient Condition	Tested By
AC Conduction	CO01-WS	22°C / 60%	Howard Huang
Radiated Emissions	03CH03-WS	24-25°C / 65-66%	Aska Huang Brad Wu
RF Conducted	TH01-WS	23°C / 62%	Felix Sung

- FCC Designation No.: TW0009
- FCC site registration No.: 207696
- IC site registration No.: 10807C-1

2.2 The Worst Test Modes and Channel Details

Test item	Modulation Mode	Test Frequency (MHz)	Data Rate	Test Configuration
Conducted Emissions	11g	2437	6 Mbps	---
Radiated Emissions ≤1GHz	11g	2437	6 Mbps	---
Radiated Emissions >1GHz Maximum Output Power 6dB bandwidth Power spectral density	11b 11g HT20 HT40	2412 / 2437 / 2462 2412 / 2437 / 2462 2412 / 2437 / 2462 2422 / 2437 / 2452	1 Mbps 6 Mbps MCS 0 MCS 0	---
NOTE: 1. The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement – X, Y, and Z-plane. The **Y-plane** results were found as the worst case and were shown in this report.				

3 Transmitter Test Results

3.1 Conducted Emissions

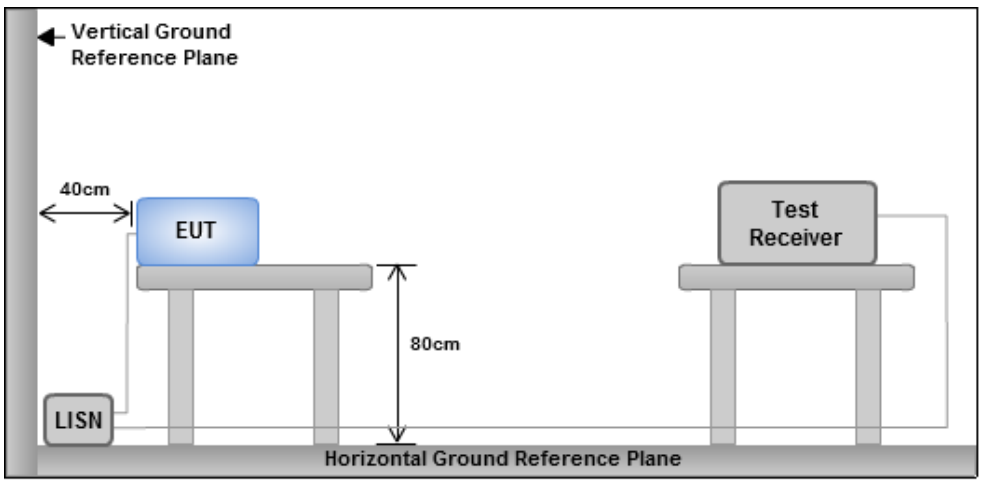
3.1.1 Limit of Conducted Emissions

Conducted Emissions Limit		
Frequency Emission (MHz)	**Quasi-Peak**	**Average**
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50
Note 1: * Decreases with the logarithm of the frequency.		

3.1.2 Test Procedures

1. The device is placed on a test table, raised 80 cm above the reference ground plane. The vertical conducting plane is located 40 cm to the rear of the device.
2. The device is connected to line impedance stabilization network (LISN) and other accessories are connected to other LISN. Measured levels of AC power line conducted emission are across the 50 Ω LISN port.
3. AC conducted emission measurements is made over frequency range from 150 kHz to 30 MHz.
4. This measurement was performed with AC 120V / 60Hz.

3.1.3 Test Setup

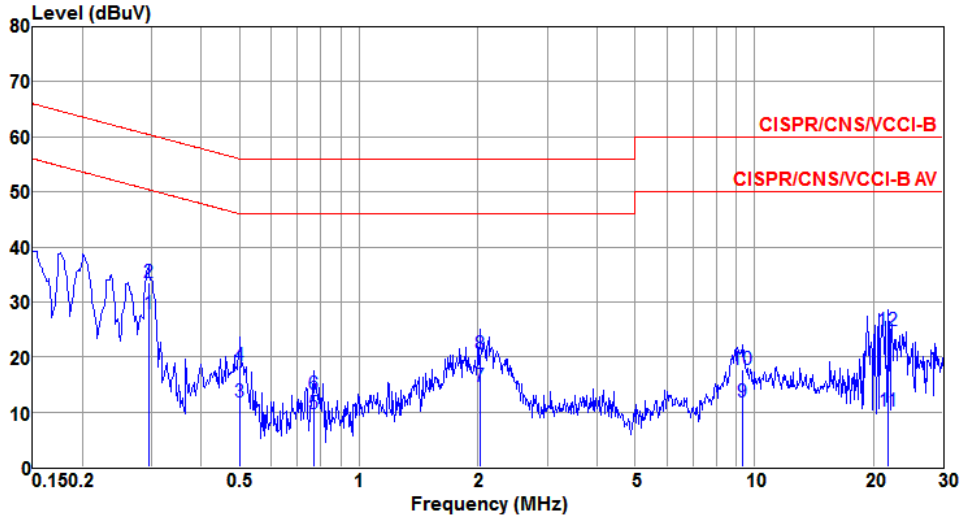


Note: 1. Support units were connected to second LISN.

2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

3.1.4 Test Result of Conducted Emissions

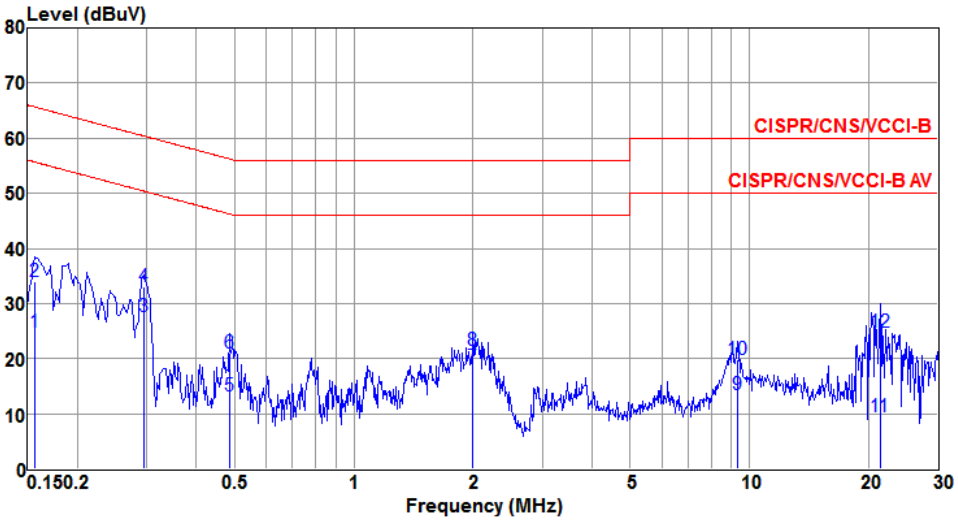
Modulation	11g	Test Freq. (MHz)	2437
Power Phase	Line		



	Freq	Level	Limit Line	Over Limit	Read Level	LISN factor	cable loss	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	dB	
1@	0.294	27.82	50.41	-22.59	27.42	0.36	0.04	Average
2	0.294	33.49	60.41	-26.92	33.09	0.36	0.04	QP
3	0.502	11.75	46.00	-34.25	11.37	0.34	0.04	Average
4	0.502	18.32	56.00	-37.68	17.94	0.34	0.04	QP
5	0.767	9.63	46.00	-36.37	9.26	0.33	0.04	Average
6	0.767	13.32	56.00	-42.68	12.95	0.33	0.04	QP
7	2.023	14.57	46.00	-31.43	14.08	0.45	0.04	Average
8	2.023	20.65	56.00	-35.35	20.16	0.45	0.04	QP
9	9.352	11.77	50.00	-38.23	10.53	1.02	0.22	Average
10	9.352	17.70	60.00	-42.30	16.46	1.02	0.22	QP
11	21.830	10.17	50.00	-39.83	9.50	0.40	0.27	Average
12	21.830	24.78	60.00	-35.22	24.11	0.40	0.27	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).
2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

Modulation	11g	Test Freq. (MHz)	2437
Power Phase	Neutral		



	Freq	Level	Limit Line	Over Limit	Read Level	LISN factor	cable loss	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	dB	
1	0.156	24.79	55.69	-30.90	24.41	0.34	0.04	Average
2	0.156	34.01	65.69	-31.68	33.63	0.34	0.04	QP
3@	0.294	27.66	50.41	-22.75	27.26	0.36	0.04	Average
4	0.294	33.11	60.41	-27.30	32.71	0.36	0.04	QP
5	0.484	13.23	46.27	-33.04	12.81	0.38	0.04	Average
6	0.484	21.00	56.27	-35.27	20.58	0.38	0.04	QP
7	2.001	18.34	46.00	-27.66	17.83	0.47	0.04	Average
8	2.001	21.51	56.00	-34.49	21.00	0.47	0.04	QP
9	9.302	13.53	50.00	-36.47	12.65	0.66	0.22	Average
10	9.302	19.72	60.00	-40.28	18.84	0.66	0.22	QP
11	21.373	9.44	50.00	-40.56	8.73	0.44	0.27	Average
12	21.373	24.83	60.00	-35.17	24.12	0.44	0.27	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).
2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

3.2 6dB and Occupied Bandwidth

3.2.1 Limit of 6dB Bandwidth

The minimum 6dB bandwidth shall be at least 500 kHz.

3.2.2 Test Procedures

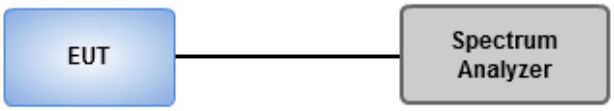
6dB Bandwidth

1. Set resolution bandwidth (RBW) = 100 kHz, Video bandwidth = 300 kHz.
2. Detector = Peak, Trace mode = max hold.
3. Sweep = auto couple, Allow the trace to stabilize.
4. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6dB relative to the maximum level measured in the fundamental emission.

Occupied Bandwidth

1. Set resolution bandwidth (RBW) = 1 MHz, Video bandwidth = 3 MHz.
2. Detector = Sample, Trace mode = max hold.
3 Sweep = auto couple, Allow the trace to stabilize.
4. Use the OBW measurement function of spectrum analyzer to measure the occupied bandwidth.

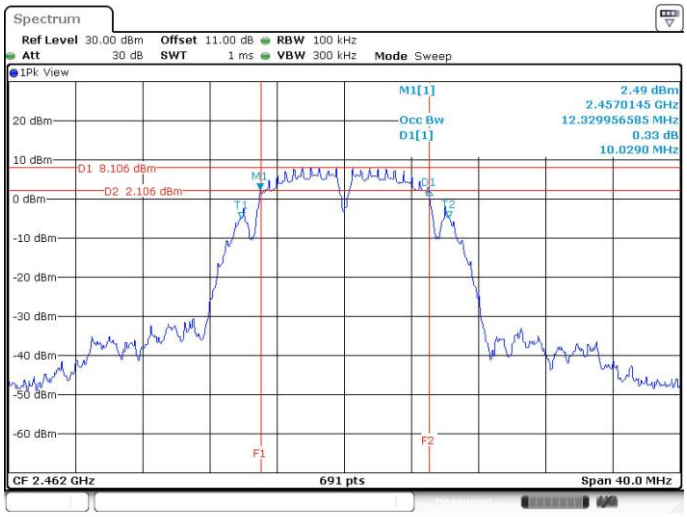
3.2.3 Test Setup



3.2.4 Test Result of 6dB and Occupied Bandwidth

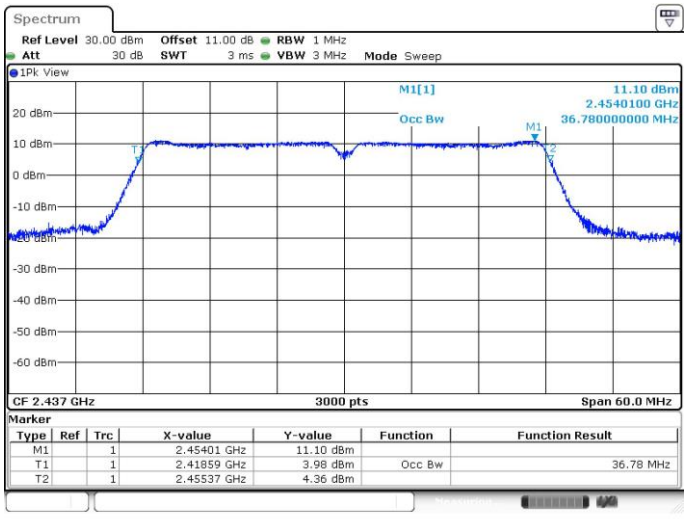
Modulation Mode	N_{TX}	Freq. (MHz)	6dB Bandwidth (MHz)				Limit (kHz)
			Chain 0	Chain 1	Chain 2	Chain 3	
11b	2	2412	10.09	10.09	---	---	500
11b	2	2437	10.09	10.09	---	---	500
11b	2	2462	10.03	10.03	---	---	500
11g	2	2412	16.35	16.35	---	---	500
11g	2	2437	16.35	16.35	---	---	500
11g	2	2462	16.35	16.35	---	---	500
HT20	2	2412	17.04	17.10	---	---	500
HT20	2	2437	17.04	17.04	---	---	500
HT20	2	2462	17.28	17.51	---	---	500
HT40	2	2422	35.94	36.29	---	---	500
HT40	2	2437	36.29	36.06	---	---	500
HT40	2	2452	36.29	36.06	---	---	500

Worst Plot



Modulation Mode	N_{TX}	Freq. (MHz)	99% Occupied Bandwidth (MHz)			
			Chain 0	Chain 1	Chain 2	Chain 3
11b	2	2412	12.30	12.31	---	---
11b	2	2437	12.31	12.32	---	---
11b	2	2462	12.29	12.29	---	---
11g	2	2412	16.97	16.91	---	---
11g	2	2437	18.03	17.73	---	---
11g	2	2462	16.94	16.91	---	---
HT20	2	2412	17.73	17.73	---	---
HT20	2	2437	18.55	18.50	---	---
HT20	2	2462	17.75	17.73	---	---
HT40	2	2422	36.70	36.68	---	---
HT40	2	2437	36.78	36.76	---	---
HT40	2	2452	36.64	36.68	---	---

Worst Plot



3.3 RF Output Power

3.3.1 Limit of RF Output Power

Conducted power shall not exceed 1Watt.

☒ Antenna gain <= 6dBi, no any corresponding reduction is in output power limit.

☐ Antenna gain > 6dBi

☐ Non Fixed, point to point operations.
The conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dB

☐ Fixed, point to point operations
Systems operating in the 2400–2483.5 MHz band that are used exclusively for fixed, point-to-point Operations, maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

Systems operating in the 5725–5850 MHz band that are used exclusively for fixed, point-to-point operations ,no any corresponding reduction is in transmitter peak output power

3.3.2 Test Procedures

☒ Maximum Peak Conducted Output Power

☐ **Spectrum analyzer**

1. Set RBW = 1MHz, VBW = 3MHz, Detector = Peak.
2. Sweep time = auto, Trace mode = max hold, Allow trace to fully stabilize.
3. Use the spectrum analyzer channel power measurement function with the band limits set equal to the DTS bandwidth edges.

☒ **Power meter**

1. A broadband Peak RF power meter is used for output power measurement. The video bandwidth of power meter is greater than DTS bandwidth of EUT. If duty cycle of test signal is not 100 %, trigger and gating function of power meter will be enabled to capture transmission burst for measuring output power.

☒ Maximum Conducted Output Power (For reference only)

☒ **Power meter**

1. A broadband Average RF power meter is used for output power measurement. The video bandwidth of power meter is greater than DTS bandwidth of EUT. If duty cycle of test signal is not 100 %, trigger and gating function of power meter will be enabled to capture transmission burst for measuring output power.

3.3.3 Test Setup

3.3.4 Test Result of Maximum Output Power

Modulation Mode	N_{TX}	Freq. (MHz)	Peak conducted Output Power (dBm)							Ant. Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)
			Chain 0	Chain 1	Chain 2	Chain 3	Total Power (mW)	Total Power (dBm)	Limit (dBm)			
11b	2	2412	21.19	21.35	---	---	267.981	24.28	30.00	3.46	27.74	36.00
11b	2	2437	20.82	20.82	---	---	241.563	23.83	30.00	3.46	27.29	36.00
11b	2	2462	21.44	21.43	---	---	278.311	24.45	30.00	3.46	27.91	36.00
11g	2	2412	24.05	23.5	---	---	477.969	26.79	30.00	3.46	30.25	36.00
11g	2	2437	25.43	25.47	---	---	701.511	28.46	30.00	3.46	31.92	36.00
11g	2	2462	24.08	24.03	---	---	508.788	27.07	30.00	3.46	30.53	36.00
HT20	2	2412	23.13	22.86	---	---	398.786	26.01	30.00	3.46	29.47	36.00
HT20	2	2437	25.38	25.46	---	---	696.704	28.43	30.00	3.46	31.89	36.00
HT20	2	2462	23.67	23.34	---	---	448.584	26.52	30.00	3.46	29.98	36.00
HT40	2	2422	20.25	19.98	---	---	205.466	23.13	30.00	3.46	26.59	36.00
HT40	2	2437	22.61	22.83	---	---	374.256	25.73	30.00	3.46	29.19	36.00
HT40	2	2452	21.14	20.94	---	---	254.182	24.05	30.00	3.46	27.51	36.00

Modulation Mode	N_{TX}	Freq. (MHz)	Conducted (Average) Output Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)
			Chain 0	Chain 1	Chain 2	Chain 3			
11b	2	2412	17.86	18.07	---	---	125.215	20.98	---
11b	2	2437	17.54	17.56	---	---	113.771	20.56	---
11b	2	2462	18.09	18.14	---	---	129.580	21.13	---
11g	2	2412	16.35	15.95	---	---	82.507	19.16	---
11g	2	2437	20.92	20.95	---	---	248.046	23.95	---
11g	2	2462	16.62	16.45	---	---	90.077	19.55	---
HT20	2	2412	15.19	15.07	---	---	65.174	18.14	---
HT20	2	2437	20.79	20.89	---	---	242.694	23.85	---
HT20	2	2462	16.15	15.94	---	---	80.474	19.06	---
HT40	2	2422	12.33	12.26	---	---	33.927	15.31	---
HT40	2	2437	16.43	16.88	---	---	92.707	19.67	---
HT40	2	2452	14.00	13.95	---	---	49.950	16.99	---

Note: Conducted average output power is for reference only.

3.4 Power Spectral Density

3.4.1 Limit of Power Spectral Density

Power spectral density shall not be greater than 8 dBm in any 3 kHz band.

3.4.2 Test Procedures

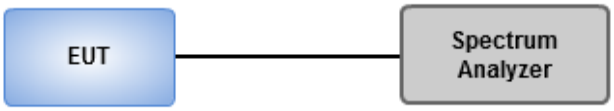
☒ Maximum peak conducted output power was used to demonstrate compliance to the fundamental output power limit.

1. Set the RBW = 3kHz, VBW = 10kHz.
2. Detector = Peak, Sweep time = auto couple.
3. Trace mode = max hold, allow trace to fully stabilize.
4. Use the peak marker function to determine the maximum amplitude level.

☐ Maximum (average) conducted output power was used to demonstrate compliance to the fundamental output power limit.

1. Set the RBW = 100kHz, VBW = 300 kHz.
2. Detector = RMS, Sweep time = auto couple.
3. Set the sweep time to: ≥ 10 x (number of measurement points in sweep) x (maximum data rate per stream).
4. Perform the measurement over a single sweep.
5. Use the peak marker function to determine the maximum amplitude level.

3.4.3 Test Setup

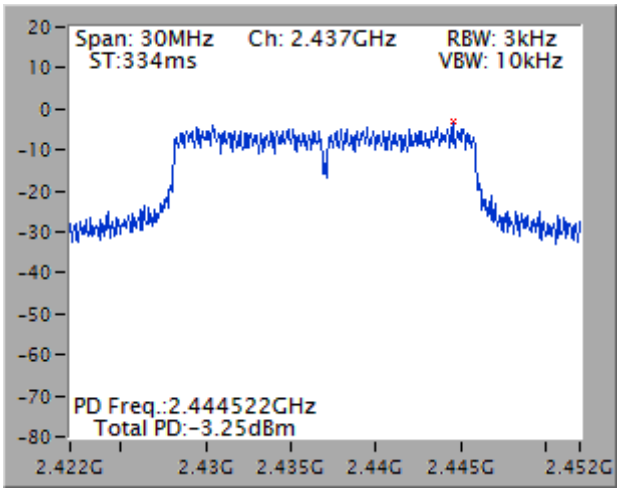


3.4.4 Test Result of Power Spectral Density

Modulation Mode	N_{TX}	Freq. (MHz)	Total Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)
11b	2	2412	-4.95	8.00
11b	2	2437	-5.51	8.00
11b	2	2462	-3.96	8.00
11g	2	2412	-8.84	8.00
11g	2	2437	-3.96	8.00
11g	2	2462	-8.45	8.00
HT20	2	2412	-8.02	8.00
HT20	2	2437	-3.25	8.00
HT20	2	2462	-8.80	8.00
HT40	2	2422	-14.94	8.00
HT40	2	2437	-10.85	8.00
HT40	2	2452	-13.13	8.00

Note: Test result is bin-by-bin summing measured value of each TX port.

Worst Plot



3.5 Unwanted Emissions into Restricted Frequency Bands

3.5.1 Limit of Unwanted Emissions into Restricted Frequency Bands

Restricted Band Emissions Limit			
Frequency Range (MHz)	**Field Strength (uV/m)**	**Field Strength (dBuV/m)**	**Measure Distance (m)**
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

Note 1:
Qusai-Peak value is measured for frequency below 1GHz except for 9–90 kHz, 110–490 kHz frequency band. Peak and average value are measured for frequency above 1GHz. The limit on average radio frequency emission is as above table. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit
Note 2:
Measurements may be performed at a distance other than what is specified provided. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor as below, Frequency at or above 30 MHz: 20 dB/decade Frequency below 30 MHz: 40 dB/decade.

3.5.2 Test Procedures

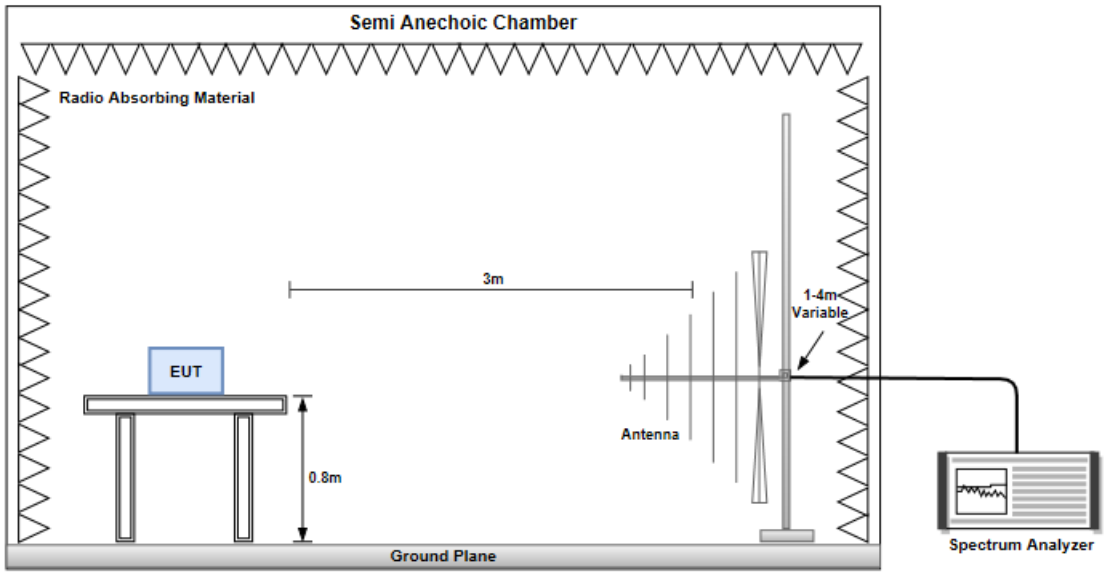
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission frequency. The EUT is placed at test table. For emissions testing at or below 1 GHz, the table height is 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height is 1.5 m
2. Measurement is made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna is varied in height (1m ~ 4m) above the reference ground plane to obtain the maximum signal strength. Distance between EUT and antenna is 3 m.
3. This investigation is performed with the EUT rotated 360°, the antenna height scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations.

Note:

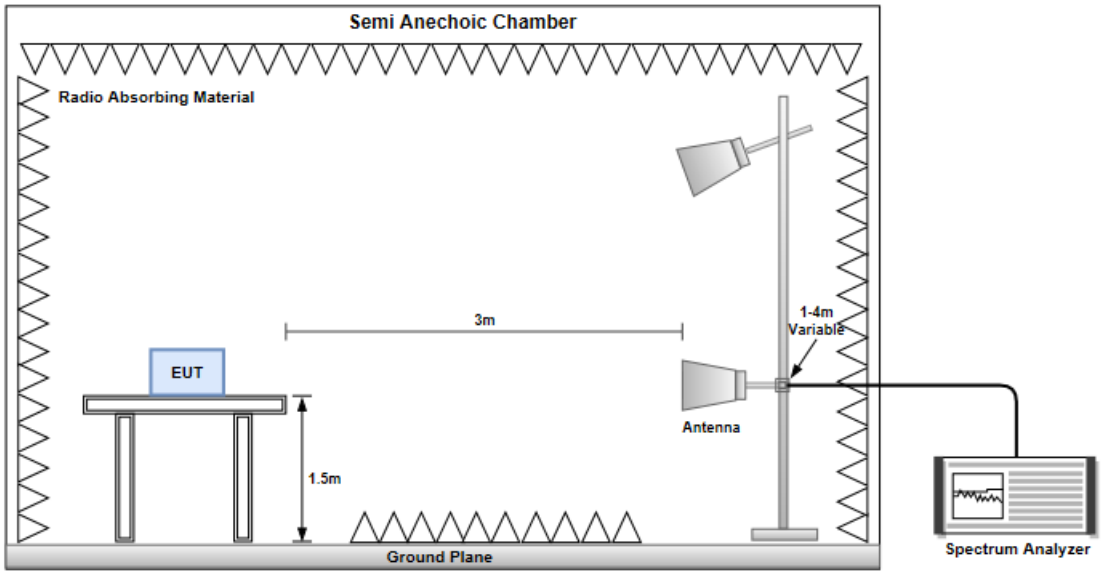
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above 1GHz.

3.5.3 Test Setup

Radiated Emissions below 1 GHz

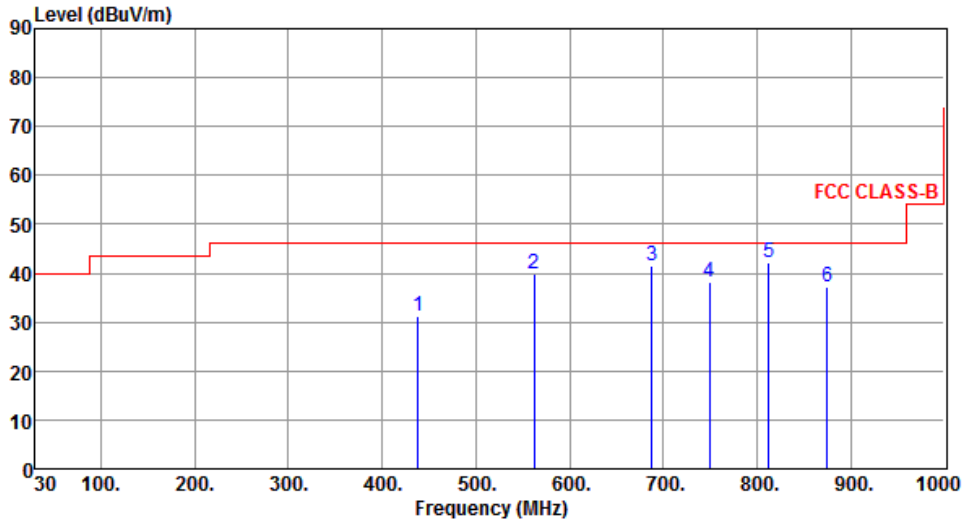


Radiated Emissions above 1 GHz



3.5.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)

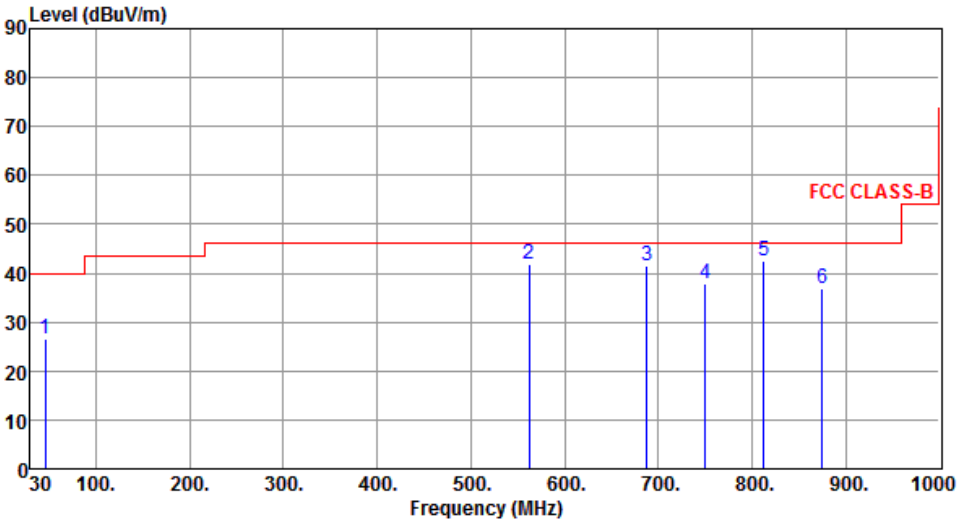
Modulation	11g	Test Freq. (MHz)	2437
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	438.25	31.24	46.00	-14.76	35.59	-4.35	Peak	---	---
2	562.46	39.81	46.00	-6.19	41.80	-1.99	Peak	---	---
3	687.54	41.53	46.00	-4.47	41.40	0.13	Peak	---	---
4	749.65	38.34	46.00	-7.66	36.76	1.58	Peak	---	---
5	812.81	42.11	46.00	-3.89	39.78	2.33	Peak	---	---
6	874.65	37.25	46.00	-8.75	34.01	3.24	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

Modulation	11g	Test Freq. (MHz)	2437
Polarization	Vertical		

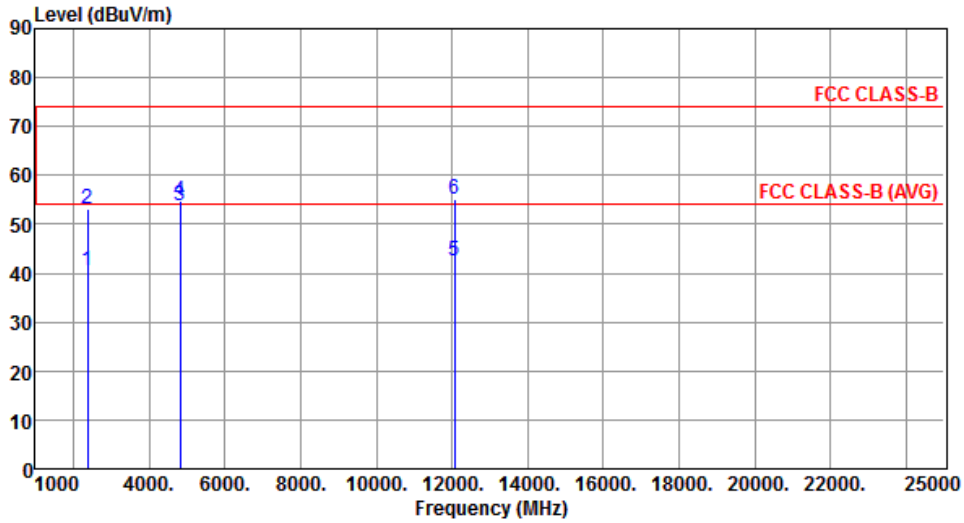


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	46.21	26.48	40.00	-13.52	34.80	-8.32	QP	100	12
2	562.45	41.82	46.00	-4.18	43.81	-1.99	Peak	---	---
3	687.55	41.54	46.00	-4.46	41.41	0.13	Peak	---	---
4	749.86	37.95	46.00	-8.05	36.36	1.59	Peak	---	---
5	812.55	42.62	46.00	-3.38	40.29	2.33	QP	100	162
6	874.58	36.85	46.00	-9.15	33.62	3.23	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

3.5.5 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 11b

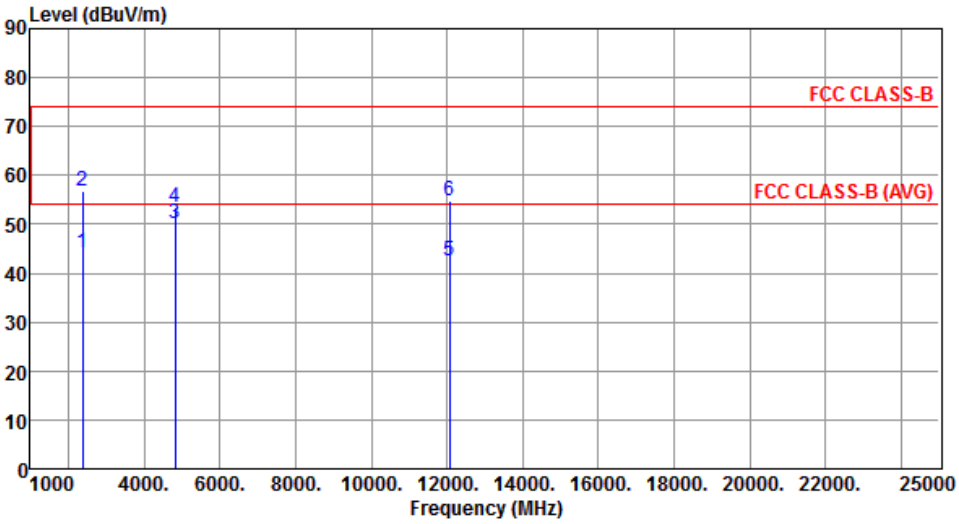
Modulation	11b	Test Freq. (MHz)	2412
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	40.59	54.00	-13.41	42.56	-1.97	Average	212	17
2	2390.00	53.24	74.00	-20.76	55.21	-1.97	Peak	212	17
3	4824.00	53.70	54.00	-0.30	49.03	4.67	Average	100	31
4	4824.00	54.75	74.00	-19.25	50.08	4.67	Peak	100	31
5	12060.00	42.37	54.00	-11.63	28.54	13.83	Average	100	224
6	12060.00	55.10	74.00	-18.90	41.27	13.83	Peak	100	224

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

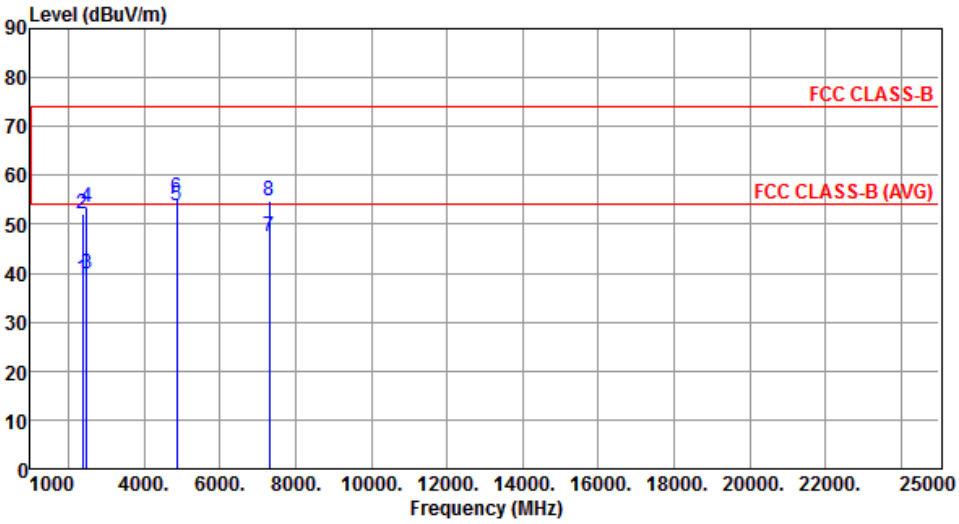
Modulation	11b	**Test Freq. (MHz)**	2412
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	44.01	54.00	-9.99	45.98	-1.97	Average	214	66
2	2390.00	56.88	74.00	-17.12	58.85	-1.97	Peak	214	66
3	4824.00	50.17	54.00	-3.83	45.50	4.67	Average	102	61
4	4824.00	53.32	74.00	-20.68	48.65	4.67	Peak	102	61
5	12060.00	42.39	54.00	-11.61	28.56	13.83	Average	100	182
6	12060.00	54.69	74.00	-19.31	40.86	13.83	Peak	100	182

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

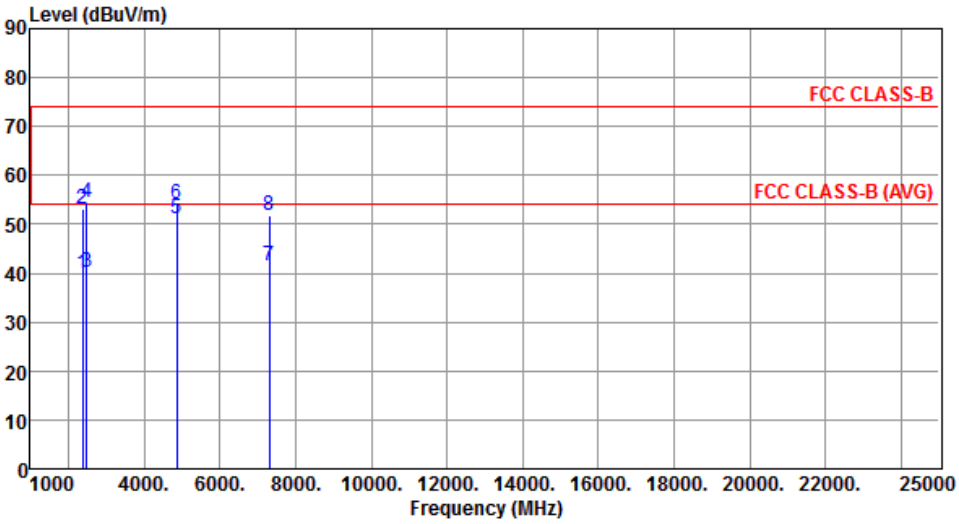
Modulation	11b	Test Freq. (MHz)	2437
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	38.88	54.00	-15.12	40.85	-1.97	Average	208	3
2	2390.00	52.24	74.00	-21.76	54.21	-1.97	Peak	208	3
3	2483.50	39.87	54.00	-14.13	41.49	-1.62	Average	208	3
4	2483.50	53.56	74.00	-20.44	55.18	-1.62	Peak	208	3
5	4874.00	53.65	54.00	-0.35	48.88	4.77	Average	100	32
6	4874.00	55.62	74.00	-18.38	50.85	4.77	Peak	100	32
7	7311.00	47.61	54.00	-6.39	38.30	9.31	Average	370	341
8	7311.00	54.81	74.00	-19.19	45.50	9.31	Peak	370	341

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

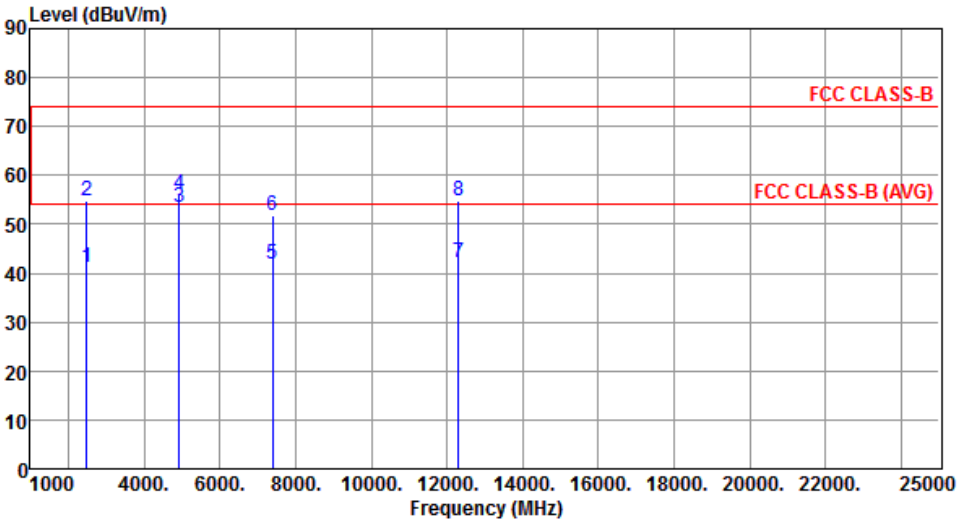
Modulation	11b	Test Freq. (MHz)	2437
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	39.80	54.00	-14.20	41.77	-1.97	Average	179	68
2	2390.00	53.25	74.00	-20.75	55.22	-1.97	Peak	179	68
3	2483.50	40.23	54.00	-13.77	41.85	-1.62	Average	179	68
4	2483.50	54.40	74.00	-19.60	56.02	-1.62	Peak	179	68
5	4874.00	51.23	54.00	-2.77	46.46	4.77	Average	100	62
6	4874.00	54.03	74.00	-19.97	49.26	4.77	Peak	100	62
7	7311.00	41.60	54.00	-12.40	32.29	9.31	Average	100	338
8	7311.00	51.66	74.00	-22.34	42.35	9.31	Peak	100	338

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

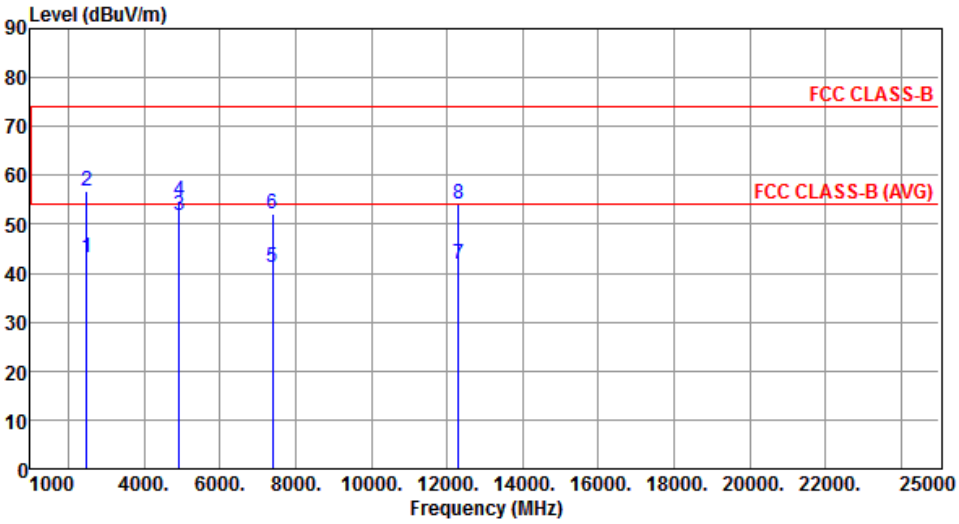
Modulation	11b	Test Freq. (MHz)	2462
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	41.17	54.00	-12.83	42.79	-1.62	Average	226	15
2	2483.50	54.91	74.00	-19.09	56.53	-1.62	Peak	226	15
3	4924.00	53.46	54.00	-0.54	48.60	4.86	Average	174	341
4	4924.00	56.16	74.00	-17.84	51.30	4.86	Peak	174	341
5	7386.00	41.86	54.00	-12.14	32.28	9.58	Average	103	338
6	7386.00	51.88	74.00	-22.12	42.30	9.58	Peak	103	338
7	12310.00	42.26	54.00	-11.74	28.76	13.50	Average	100	231
8	12310.00	54.85	74.00	-19.15	41.35	13.50	Peak	100	231

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Modulation	11b	Test Freq. (MHz)	2462
Polarization	Vertical		

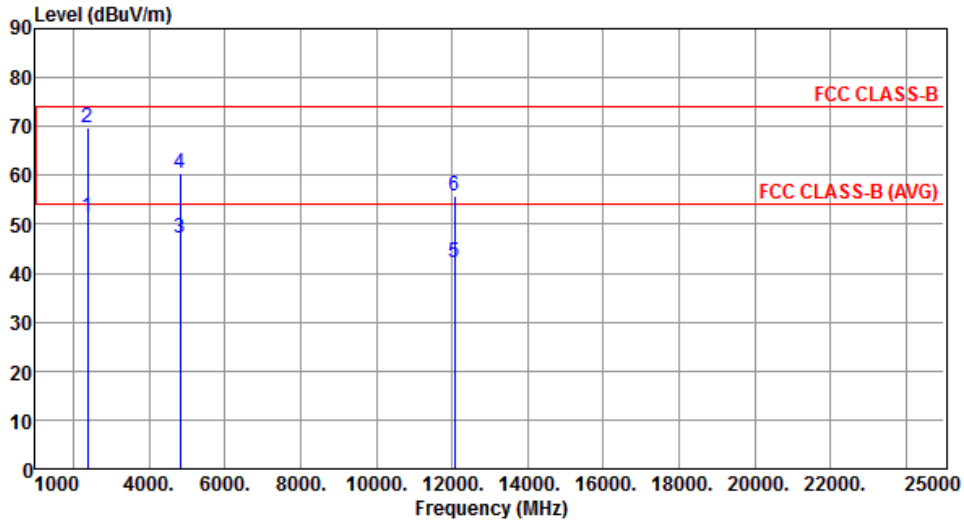


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	43.13	54.00	-10.87	44.75	-1.62	Average	215	66
2	2483.50	56.81	74.00	-17.19	58.43	-1.62	Peak	215	66
3	4924.00	51.94	54.00	-2.06	47.08	4.86	Average	100	62
4	4924.00	54.75	74.00	-19.25	49.89	4.86	Peak	100	62
5	7386.00	41.32	54.00	-12.68	31.74	9.58	Average	100	331
6	7386.00	52.25	74.00	-21.75	42.67	9.58	Peak	100	331
7	12310.00	41.96	54.00	-12.04	28.46	13.50	Average	100	188
8	12310.00	54.25	74.00	-19.75	40.75	13.50	Peak	100	188

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

3.5.6 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 11g

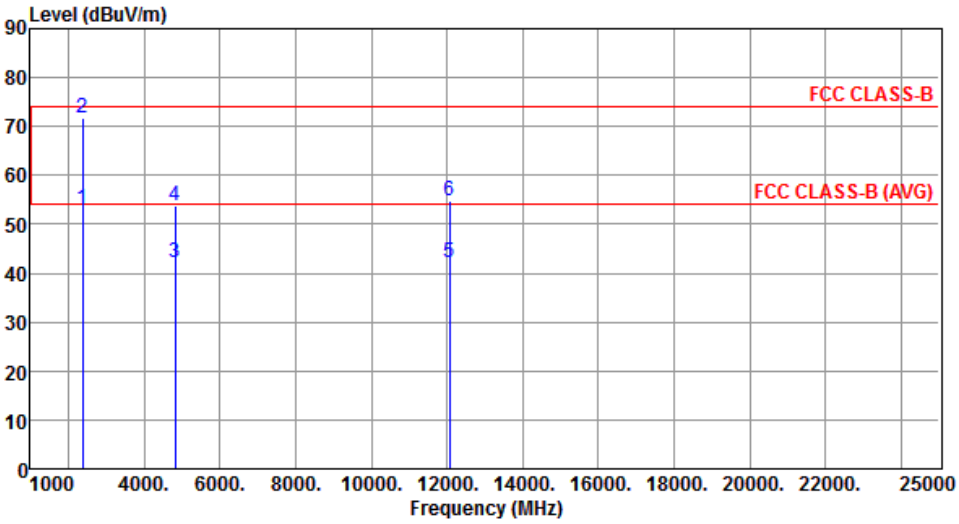
Modulation	11g	Test Freq. (MHz)	2412
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	51.39	54.00	-2.61	53.36	-1.97	Average	203	169
2	2390.00	69.58	74.00	-4.42	71.55	-1.97	Peak	203	169
3	4824.00	47.29	54.00	-6.71	42.62	4.67	Average	173	330
4	4824.00	60.33	74.00	-13.67	55.66	4.67	Peak	173	330
5	12060.00	42.31	54.00	-11.69	28.48	13.83	Average	104	175
6	12060.00	55.88	74.00	-18.12	42.05	13.83	Peak	104	175

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

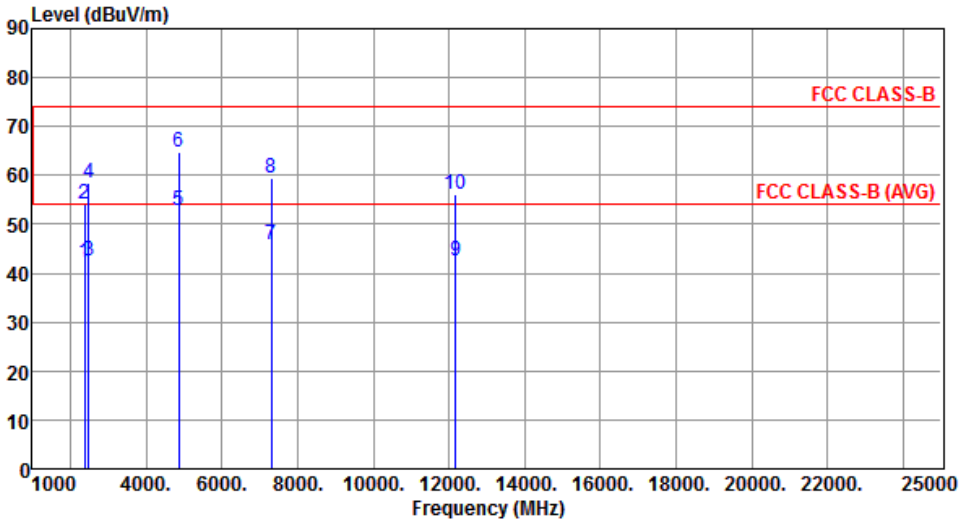
Modulation	11g	**Test Freq. (MHz)**	2412
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	53.22	54.00	-0.78	55.19	-1.97	Average	222	32
2	2390.00	71.73	74.00	-2.27	73.70	-1.97	Peak	222	32
3	4824.00	42.11	54.00	-11.89	37.44	4.67	Average	179	315
4	4824.00	53.86	74.00	-20.14	49.19	4.67	Peak	179	315
5	12060.00	42.08	54.00	-11.92	28.25	13.83	Average	101	224
6	12060.00	54.93	74.00	-19.07	41.10	13.83	Peak	101	224

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

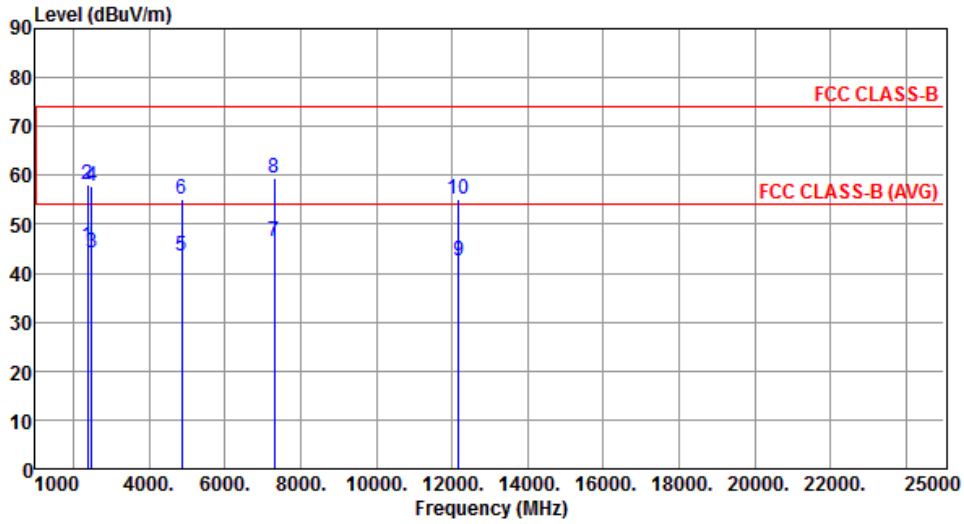
Modulation	11g	Test Freq. (MHz)	2437
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	42.31	54.00	-11.69	44.28	-1.97	Average	198	171
2	2390.00	54.06	74.00	-19.94	56.03	-1.97	Peak	198	171
3	2483.50	42.53	54.00	-11.47	44.15	-1.62	Average	198	171
4	2483.50	58.56	74.00	-15.44	60.18	-1.62	Peak	198	171
5	4874.00	52.66	54.00	-1.34	47.89	4.77	Average	185	331
6	4874.00	64.62	74.00	-9.38	59.85	4.77	Peak	185	331
7	7311.00	45.72	54.00	-8.28	36.41	9.31	Average	376	347
8	7311.00	59.30	74.00	-14.70	49.99	9.31	Peak	376	347
9	12185.00	42.47	54.00	-11.53	28.80	13.67	Average	100	172
10	12185.00	56.08	74.00	-17.92	42.41	13.67	Peak	100	172

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

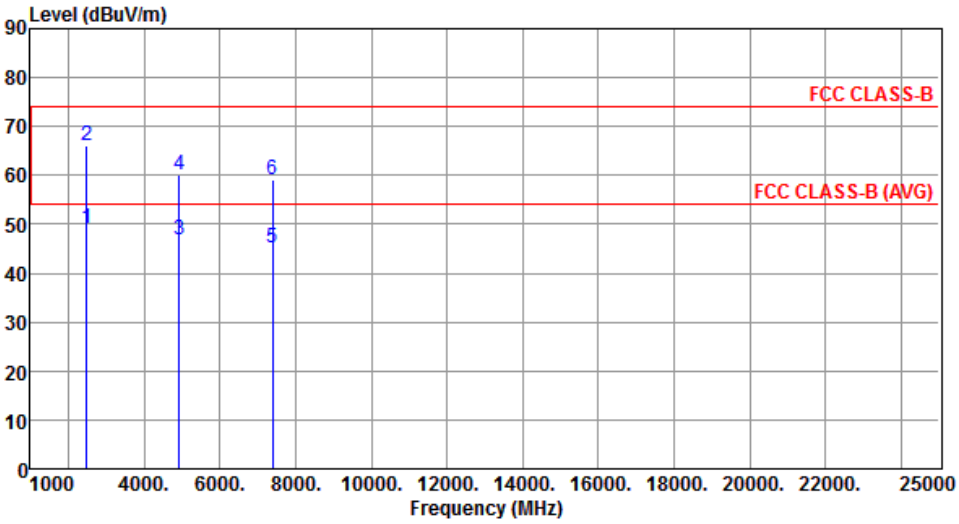
Modulation	11g	Test Freq. (MHz)	2437
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	45.53	54.00	-8.47	47.50	-1.97	Average	204	36
2	2390.00	58.05	74.00	-15.95	60.02	-1.97	Peak	204	36
3	2483.50	44.13	54.00	-9.87	45.75	-1.62	Average	204	36
4	2483.50	57.78	74.00	-16.22	59.40	-1.62	Peak	204	36
5	4874.00	43.38	54.00	-10.62	38.61	4.77	Average	176	329
6	4874.00	55.10	74.00	-18.90	50.33	4.77	Peak	176	329
7	7311.00	46.38	54.00	-7.62	37.07	9.31	Average	356	340
8	7311.00	59.44	74.00	-14.56	50.13	9.31	Peak	356	340
9	12185.00	42.50	54.00	-11.50	28.83	13.67	Average	100	218
10	12185.00	55.18	74.00	-18.82	41.51	13.67	Peak	100	218

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

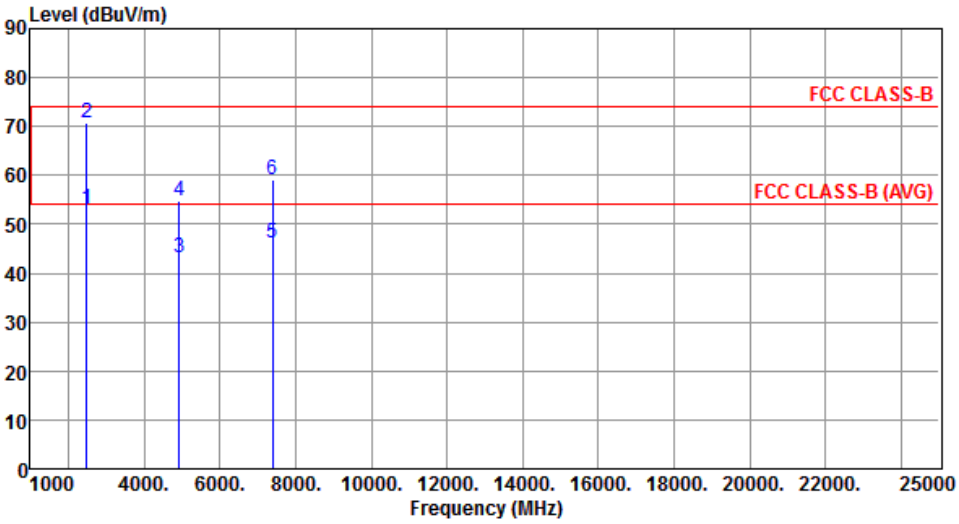
Modulation	11g	Test Freq. (MHz)	2462
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	49.13	54.00	-4.87	50.75	-1.62	Average	214	170
2	2483.50	66.25	74.00	-7.75	67.87	-1.62	Peak	214	170
3	4924.00	46.97	54.00	-7.03	42.11	4.86	Average	176	326
4	4924.00	60.12	74.00	-13.88	55.26	4.86	Peak	176	326
5	7386.00	45.29	54.00	-8.71	35.71	9.58	Average	368	342
6	7386.00	59.08	74.00	-14.92	49.50	9.58	Peak	368	342

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Modulation	11g	Test Freq. (MHz)	2462
Polarization	Vertical		

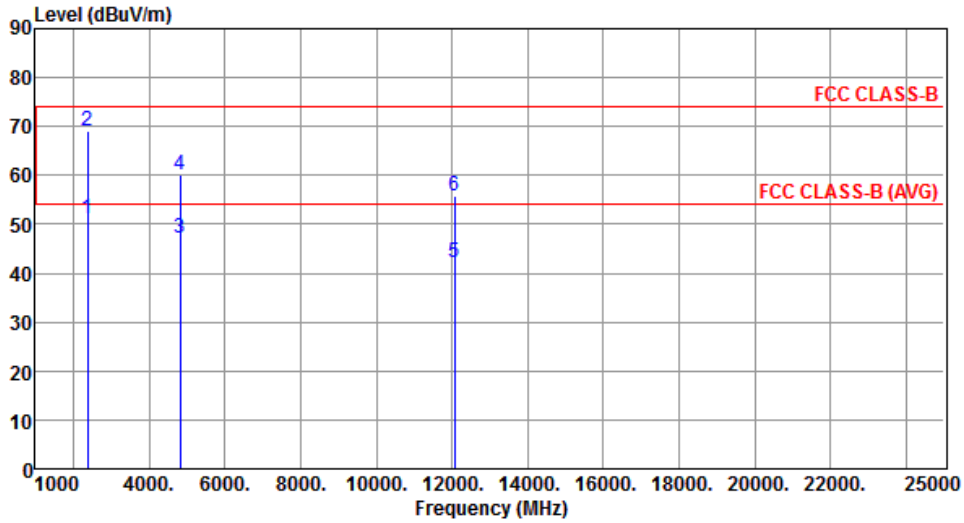


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	53.04	54.00	-0.96	54.66	-1.62	Average	213	31
2	2483.50	70.58	74.00	-3.42	72.20	-1.62	Peak	213	31
3	4924.00	43.15	54.00	-10.85	38.29	4.86	Average	182	334
4	4924.00	54.96	74.00	-19.04	50.10	4.86	Peak	182	334
5	7386.00	46.17	54.00	-7.83	36.59	9.58	Average	355	341
6	7386.00	59.21	74.00	-14.79	49.63	9.58	Peak	355	341

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

3.5.7 Transmitter Radiated Unwanted Emissions (Above 1GHz) for HT20

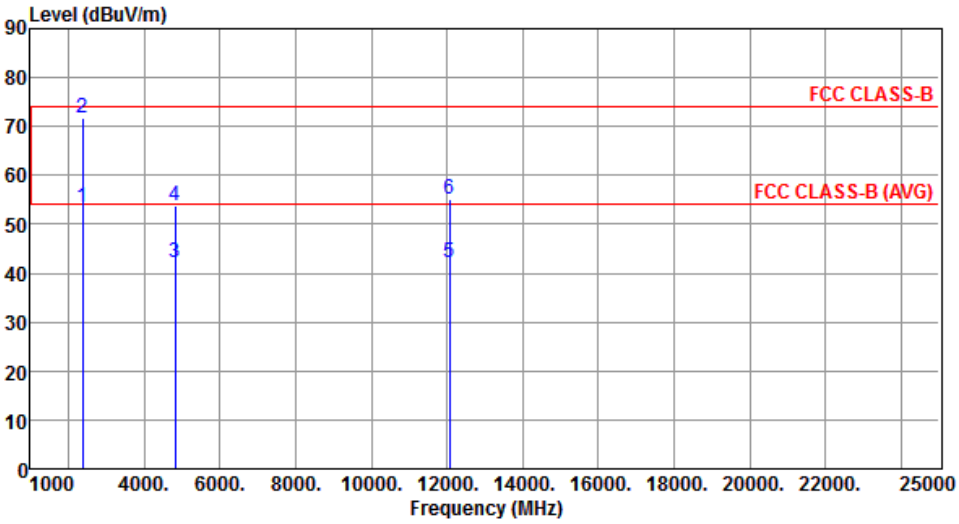
Modulation	HT20	Test Freq. (MHz)	2412
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	51.04	54.00	-2.96	53.01	-1.97	Average	205	166
2	2390.00	69.21	74.00	-4.79	71.18	-1.97	Peak	205	166
3	4824.00	47.06	54.00	-6.94	42.39	4.67	Average	175	328
4	4824.00	60.19	74.00	-13.81	55.52	4.67	Peak	175	328
5	12060.00	42.25	54.00	-11.75	28.42	13.83	Average	109	176
6	12060.00	55.66	74.00	-18.34	41.83	13.83	Peak	109	176

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

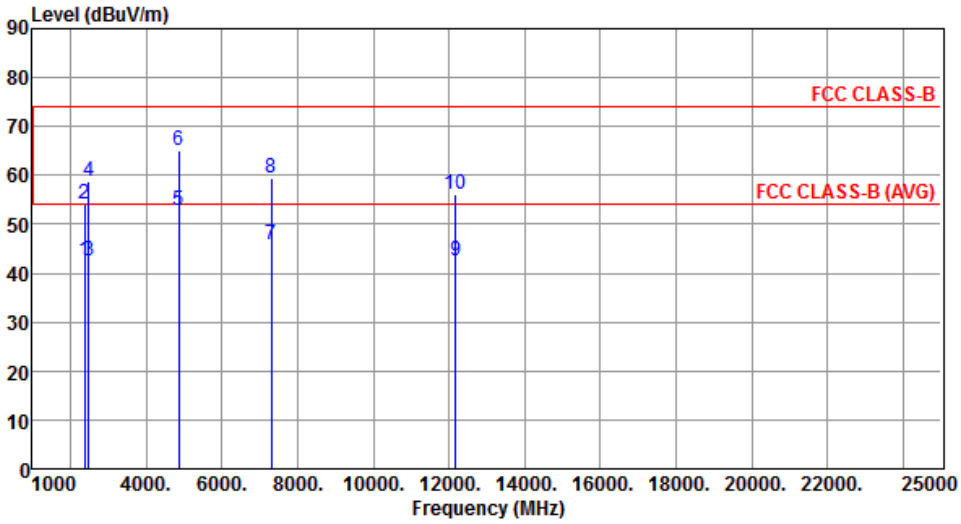
Modulation	HT20	Test Freq. (MHz)	2412
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	53.34	54.00	-0.66	55.31	-1.97	Average	224	33
2	2390.00	71.88	74.00	-2.12	73.85	-1.97	Peak	224	33
3	4824.00	42.25	54.00	-11.75	37.58	4.67	Average	183	304
4	4824.00	53.95	74.00	-20.05	49.28	4.67	Peak	183	304
5	12060.00	42.21	54.00	-11.79	28.38	13.83	Average	105	229
6	12060.00	55.16	74.00	-18.84	41.33	13.83	Peak	105	229

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

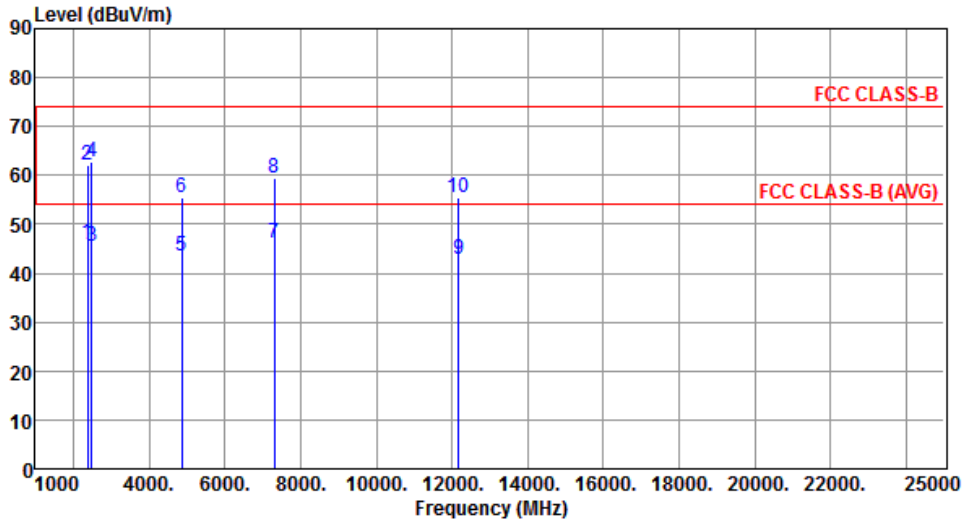
Modulation	HT20	Test Freq. (MHz)	2437
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	42.44	54.00	-11.56	44.41	-1.97	Average	201	174
2	2390.00	54.18	74.00	-19.82	56.15	-1.97	Peak	201	174
3	2483.50	42.61	54.00	-11.39	44.23	-1.62	Average	201	174
4	2483.50	58.74	74.00	-15.26	60.36	-1.62	Peak	201	174
5	4874.00	52.83	54.00	-1.17	48.06	4.77	Average	184	332
6	4874.00	65.02	74.00	-8.98	60.25	4.77	Peak	184	332
7	7311.00	45.86	54.00	-8.14	36.55	9.31	Average	372	341
8	7311.00	59.46	74.00	-14.54	50.15	9.31	Peak	372	341
9	12185.00	42.35	54.00	-11.65	28.68	13.67	Average	105	175
10	12185.00	56.11	74.00	-17.89	42.44	13.67	Peak	105	175

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

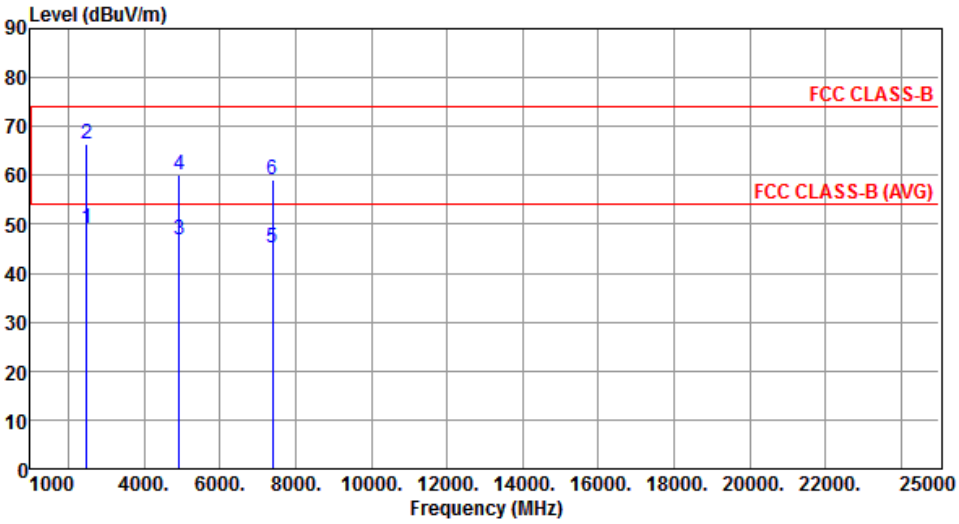
Modulation	HT20	Test Freq. (MHz)	2437
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	46.09	54.00	-7.91	48.06	-1.97	Average	198	43
2	2390.00	62.24	74.00	-11.76	64.21	-1.97	Peak	198	43
3	2483.50	45.60	54.00	-8.40	47.22	-1.62	Average	198	43
4	2483.50	62.83	74.00	-11.17	64.45	-1.62	Peak	198	43
5	4874.00	43.52	54.00	-10.48	38.75	4.77	Average	175	323
6	4874.00	55.36	74.00	-18.64	50.59	4.77	Peak	175	323
7	7311.00	46.24	54.00	-7.76	36.93	9.31	Average	351	342
8	7311.00	59.31	74.00	-14.69	50.00	9.31	Peak	351	342
9	12185.00	42.69	54.00	-11.31	29.02	13.67	Average	105	224
10	12185.00	55.31	74.00	-18.69	41.64	13.67	Peak	105	224

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

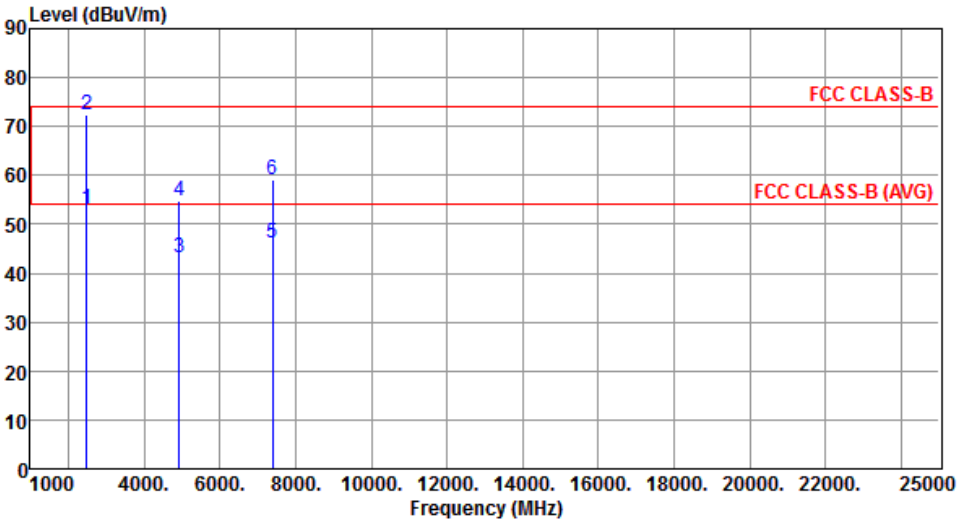
Modulation	HT20	Test Freq. (MHz)	2462
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	49.25	54.00	-4.75	50.87	-1.62	Average	215	168
2	2483.50	66.38	74.00	-7.62	68.00	-1.62	Peak	215	168
3	4924.00	46.85	54.00	-7.15	41.99	4.86	Average	171	328
4	4924.00	60.06	74.00	-13.94	55.20	4.86	Peak	171	328
5	7386.00	45.15	54.00	-8.85	35.57	9.58	Average	349	352
6	7386.00	59.13	74.00	-14.87	49.55	9.58	Peak	349	352

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Modulation	HT20	Test Freq. (MHz)	2462
Polarization	Vertical		

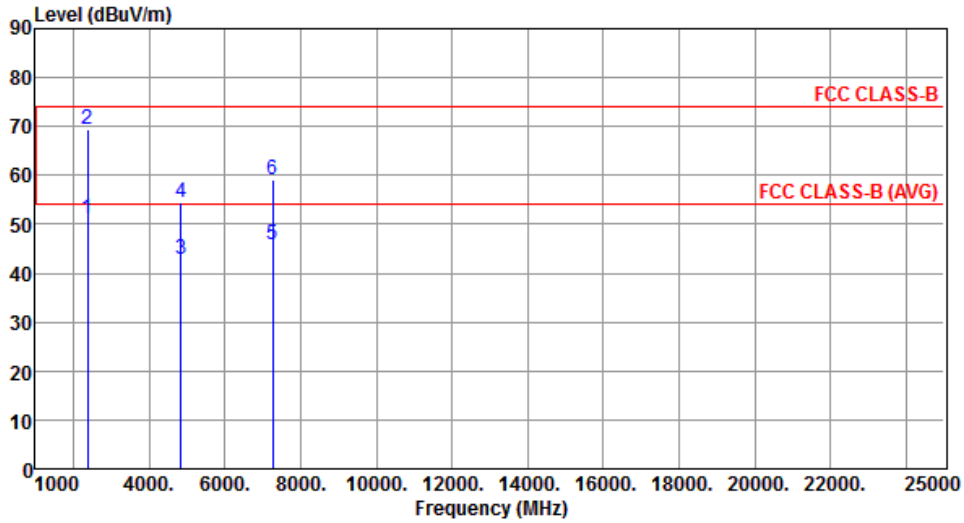


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	53.22	54.00	-0.78	54.84	-1.62	Average	211	28
2	2483.50	72.54	74.00	-1.46	74.16	-1.62	Peak	211	28
3	4924.00	43.06	54.00	-10.94	38.20	4.86	Average	185	331
4	4924.00	54.81	74.00	-19.19	49.95	4.86	Peak	185	331
5	7386.00	46.04	54.00	-7.96	36.46	9.58	Average	351	338
6	7386.00	59.15	74.00	-14.85	49.57	9.58	Peak	351	338

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

3.5.8 Transmitter Radiated Unwanted Emissions (Above 1GHz) for HT40

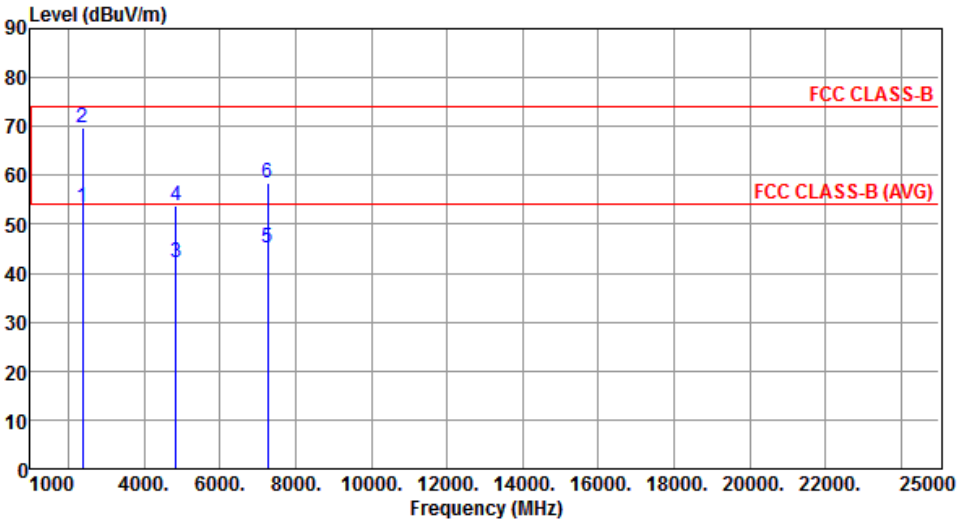
Modulation	HT40	**Test Freq. (MHz)**	2422
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	51.16	54.00	-2.84	53.13	-1.97	Average	206	172
2	2390.00	69.35	74.00	-4.65	71.32	-1.97	Peak	206	172
3	4844.00	42.83	54.00	-11.17	38.13	4.70	Average	179	331
4	4844.00	54.62	74.00	-19.38	49.92	4.70	Peak	179	331
5	7266.00	45.81	54.00	-8.19	36.66	9.15	Average	188	236
6	7266.00	59.03	74.00	-14.97	49.88	9.15	Peak	188	236

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

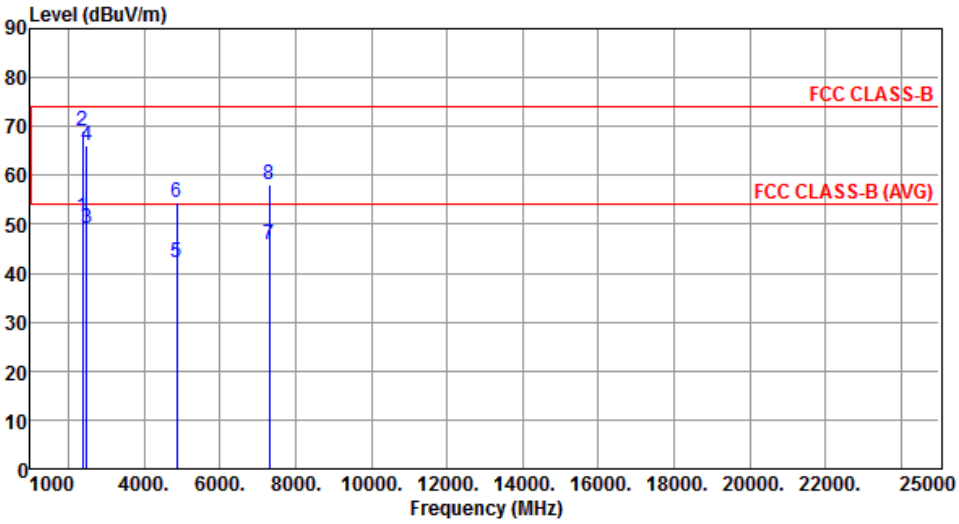
Modulation	HT40	Test Freq. (MHz)	2422
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	53.48	54.00	-0.52	55.45	-1.97	Average	203	34
2	2390.00	69.78	74.00	-4.22	71.75	-1.97	Peak	203	34
3	4844.00	42.14	54.00	-11.86	37.44	4.70	Average	189	306
4	4844.00	53.81	74.00	-20.19	49.11	4.70	Peak	189	306
5	7266.00	45.25	54.00	-8.75	36.10	9.15	Average	168	309
6	7266.00	58.41	74.00	-15.59	49.26	9.15	Peak	168	309

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

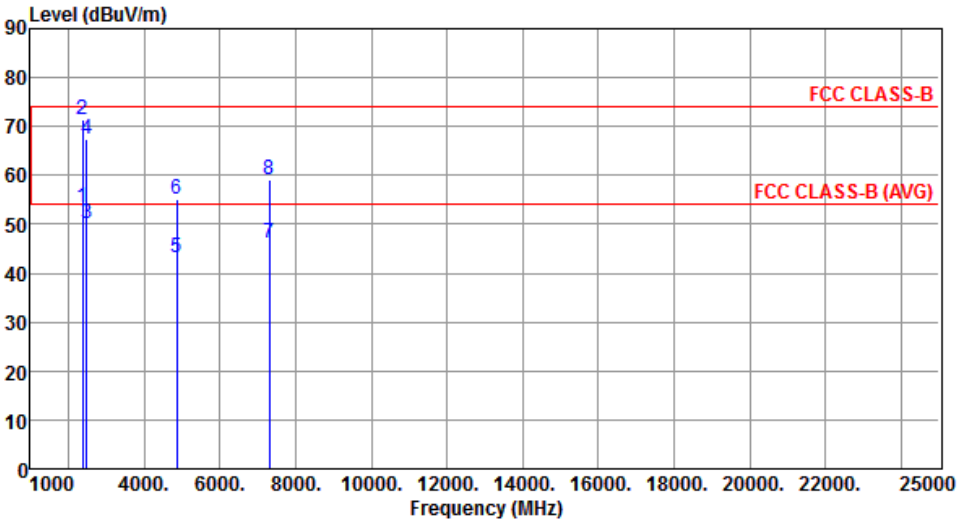
Modulation	HT40	Test Freq. (MHz)	2437
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	51.42	54.00	-2.58	53.39	-1.97	Average	205	164
2	2390.00	69.08	74.00	-4.92	71.05	-1.97	Peak	205	164
3	2483.50	49.08	54.00	-4.92	50.70	-1.62	Average	205	164
4	2483.50	66.25	74.00	-7.75	67.87	-1.62	Peak	205	164
5	4874.00	42.25	54.00	-11.75	37.48	4.77	Average	177	335
6	4874.00	54.31	74.00	-19.69	49.54	4.77	Peak	177	335
7	7311.00	45.68	54.00	-8.32	36.37	9.31	Average	189	241
8	7311.00	58.22	74.00	-15.78	48.91	9.31	Peak	189	241

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

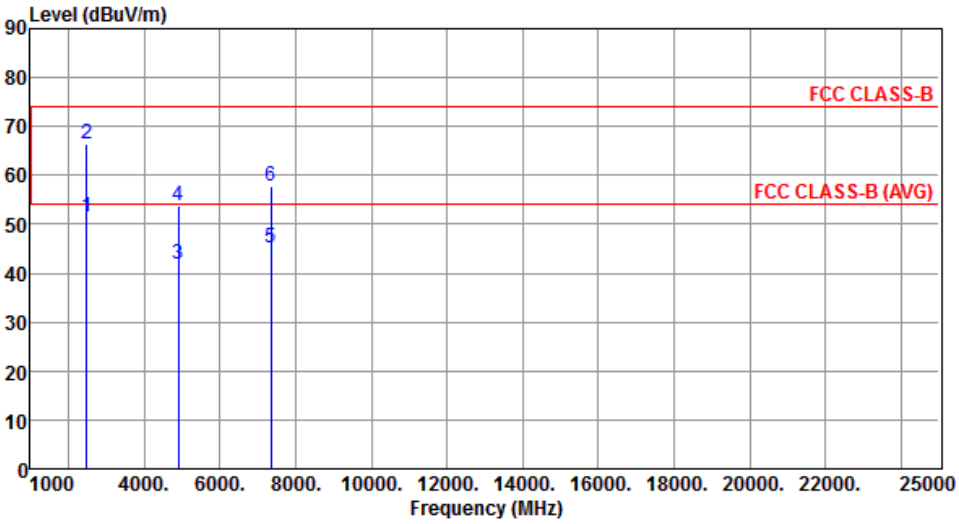
Modulation	HT40	Test Freq. (MHz)	2437
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	53.57	54.00	-0.43	55.54	-1.97	Average	203	33
2	2390.00	71.25	74.00	-2.75	73.22	-1.97	Peak	203	33
3	2483.50	50.31	54.00	-3.69	51.93	-1.62	Average	203	33
4	2483.50	67.54	74.00	-6.46	69.16	-1.62	Peak	203	33
5	4874.00	43.26	54.00	-10.74	38.49	4.77	Average	176	315
6	4874.00	55.15	74.00	-18.85	50.38	4.77	Peak	176	315
7	7311.00	46.02	54.00	-7.98	36.71	9.31	Average	345	352
8	7311.00	59.14	74.00	-14.86	49.83	9.31	Peak	345	352

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

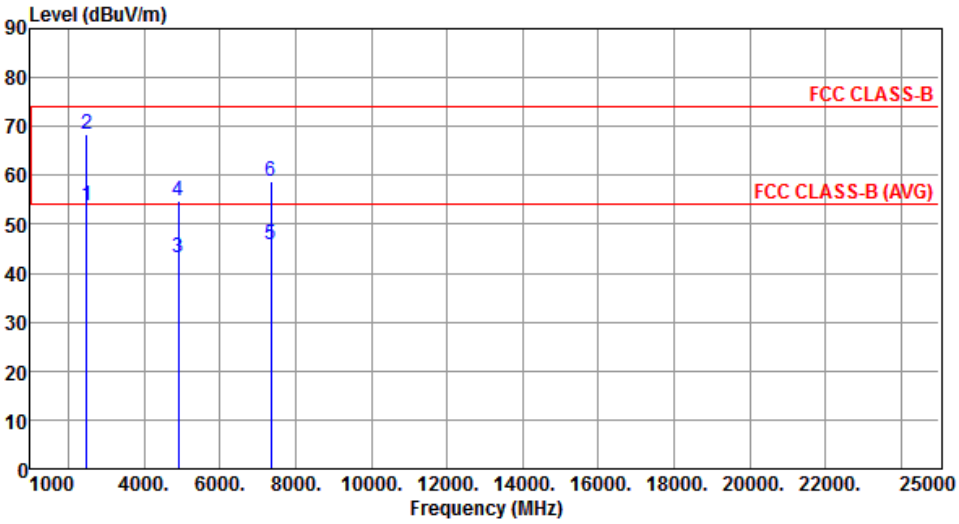
Modulation	HT40	Test Freq. (MHz)	2452
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	51.44	54.00	-2.56	53.06	-1.62	Average	208	166
2	2483.50	66.38	74.00	-7.62	68.00	-1.62	Peak	208	166
3	4904.00	41.88	54.00	-12.12	37.06	4.82	Average	169	328
4	4904.00	53.95	74.00	-20.05	49.13	4.82	Peak	169	328
5	7356.00	45.21	54.00	-8.79	35.74	9.47	Average	188	243
6	7356.00	57.94	74.00	-16.06	48.47	9.47	Peak	188	243

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Modulation	HT40	Test Freq. (MHz)	2452
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	53.65	54.00	-0.35	55.27	-1.62	Average	210	44
2	2483.50	68.52	74.00	-5.48	70.14	-1.62	Peak	210	44
3	4904.00	43.04	54.00	-10.96	38.22	4.82	Average	175	308
4	4904.00	54.82	74.00	-19.18	50.00	4.82	Peak	175	308
5	7356.00	45.93	54.00	-8.07	36.46	9.47	Average	355	346
6	7356.00	58.82	74.00	-15.18	49.35	9.47	Peak	355	346

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

3.6 Emissions in Non-Restricted Frequency Bands

3.6.1 Emissions in Non-Restricted Frequency Bands Limit

Peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz

3.6.2 Test Procedures

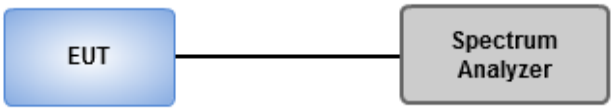
Reference level measurement

1. Set RBW=100kHz, VBW = 300kHz , Detector = Peak, Sweep time = Auto
2. Trace = max hold , Allow Trace to fully stabilize
3. Use the peak marker function to determine the maximum PSD level

Emission level measurement

1. Set RBW=100kHz, VBW = 300kHz , Detector = Peak, Sweep time = Auto
2. Trace = max hold , Allow Trace to fully stabilize
3. Scan Frequency range is up to 25GHz
4. Use the peak marker function to determine the maximum amplitude level

3.6.3 Test Setup

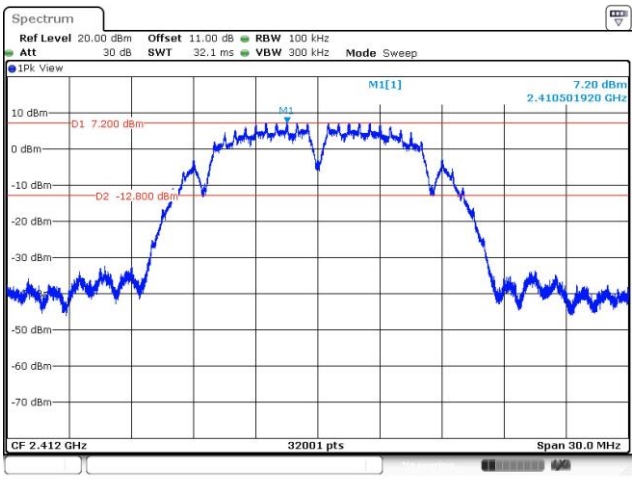
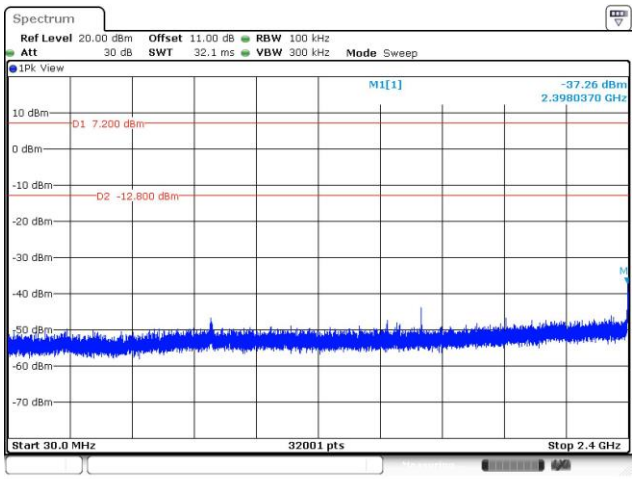
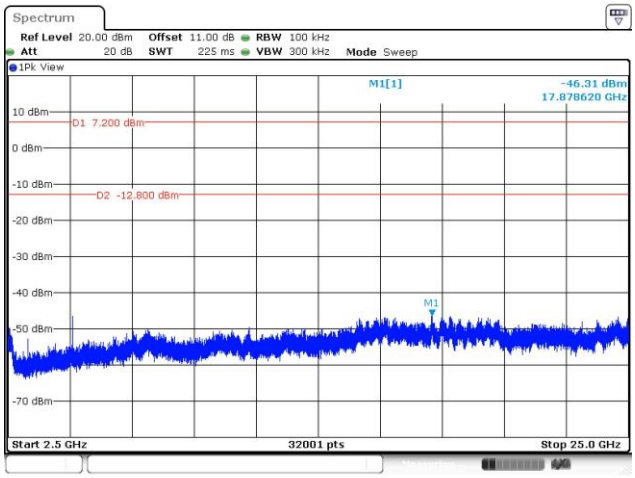
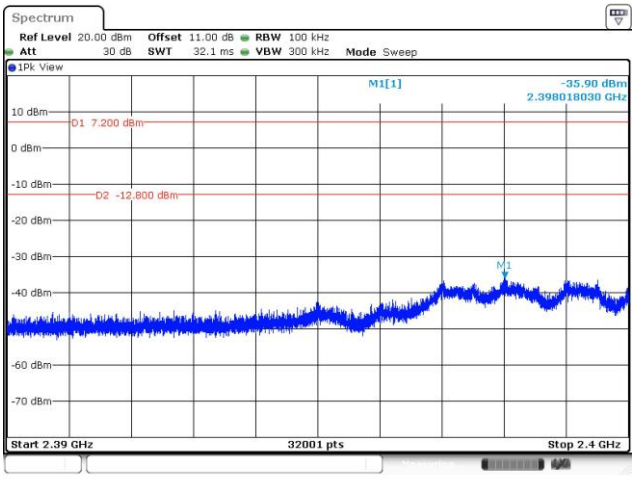


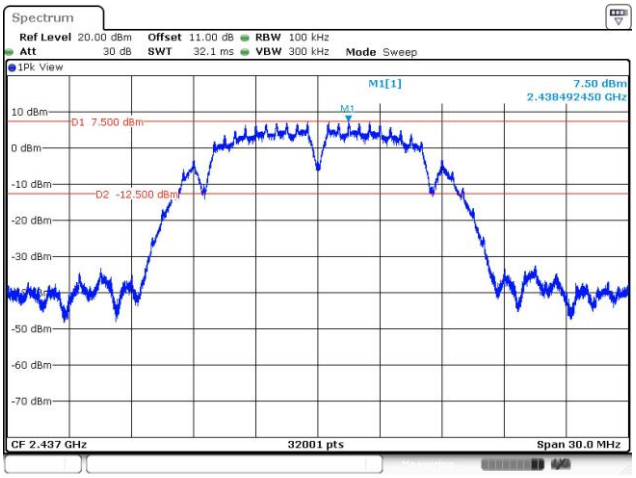
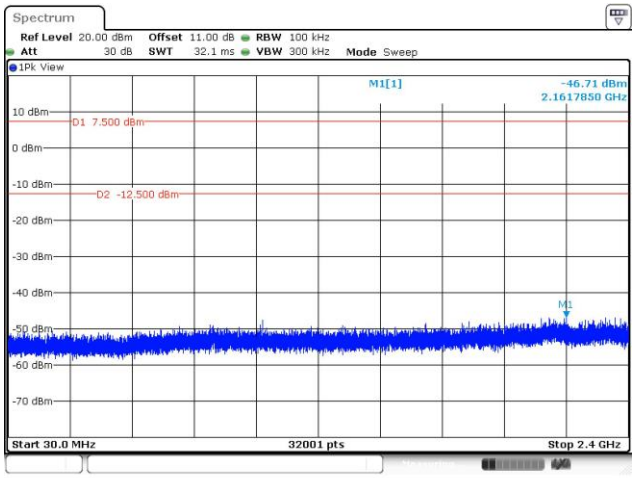
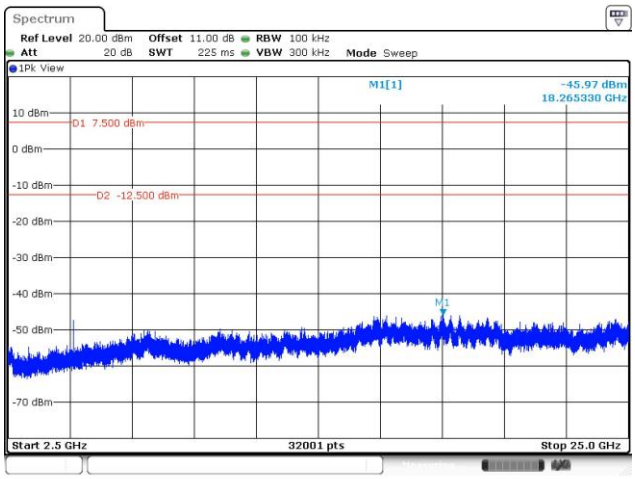
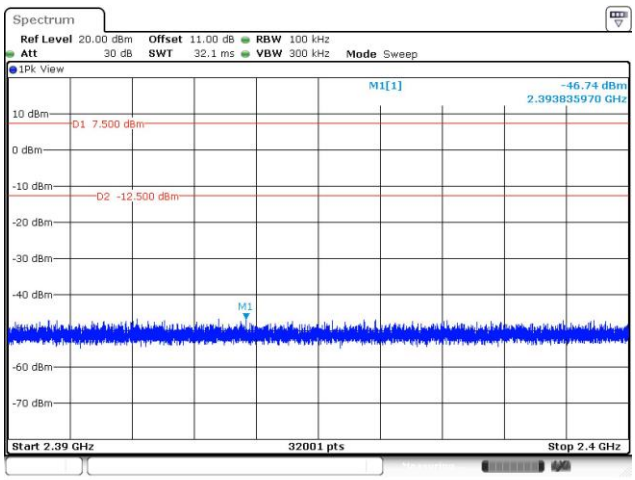
3.6.4 Test Result of Emissions in non-restricted frequency bands

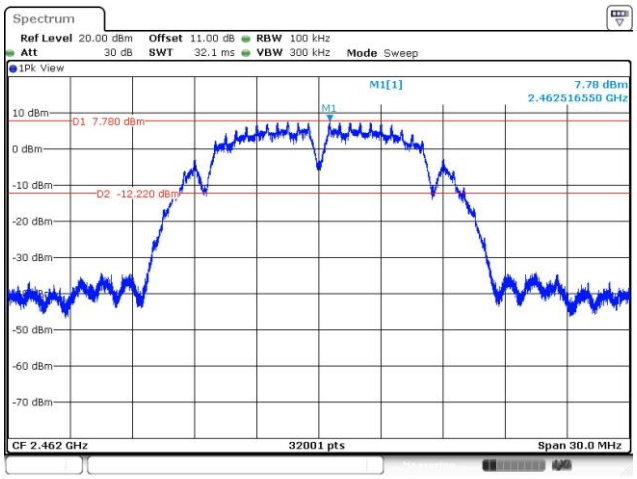
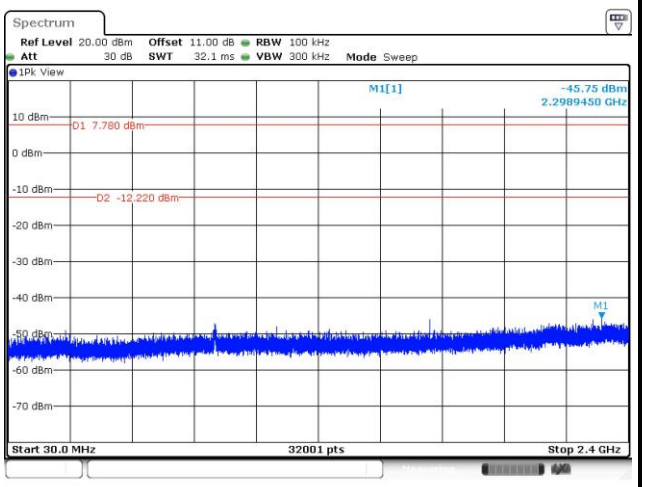
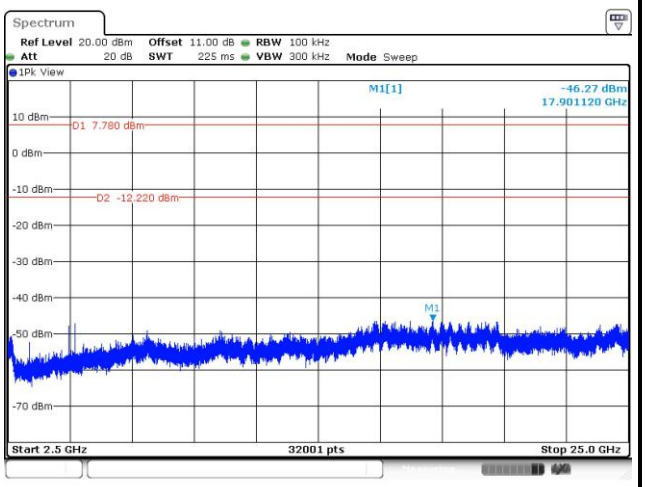
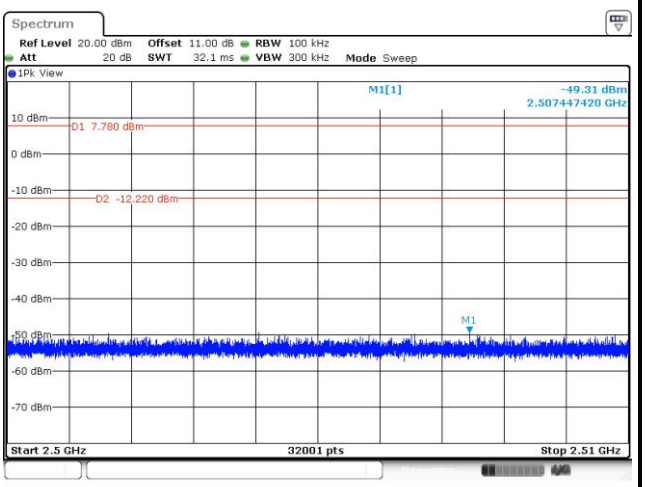
This test item is performed on each TX output individually without summing or adding 10 log(N_{ANT}) since measurements are made relative to the in-band emissions on the individual outputs. Only worst test result of each operating mode is presented.

3.6.5 Unwanted Emissions into Non-Restricted Frequency Bands

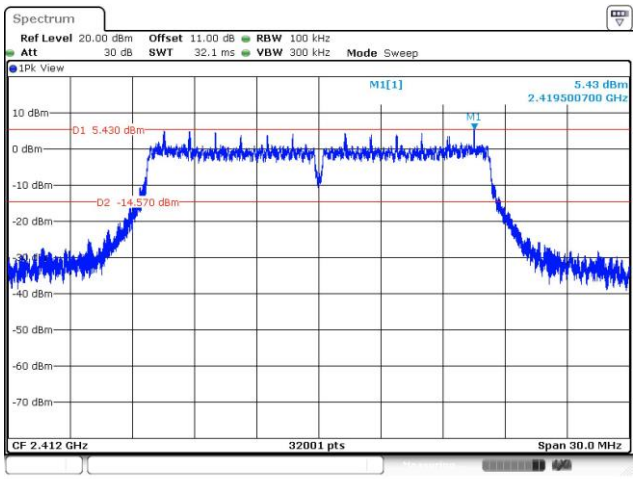
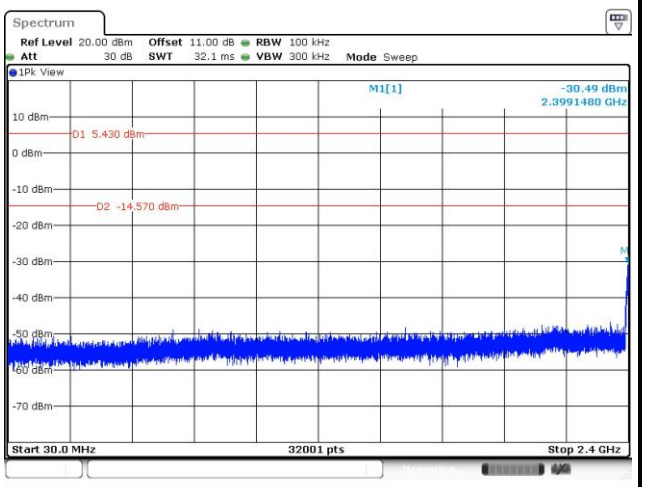
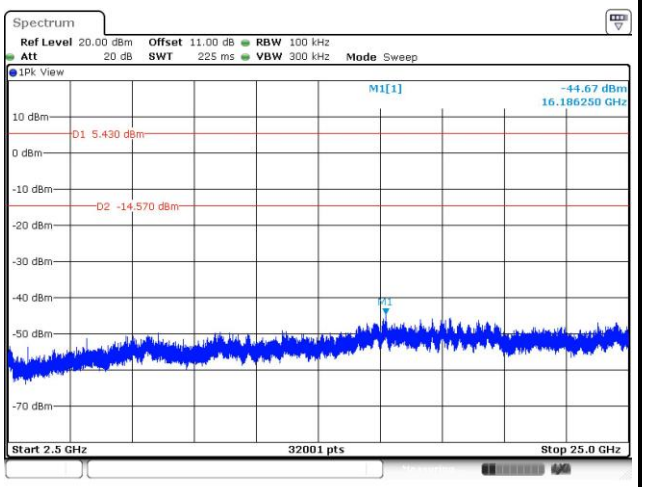
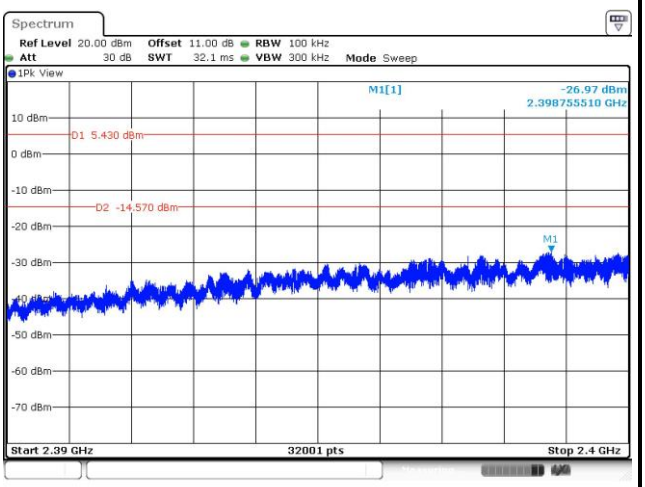
802.11b

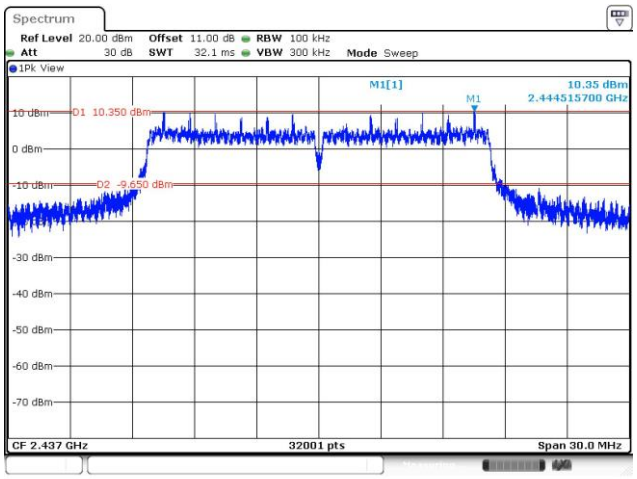
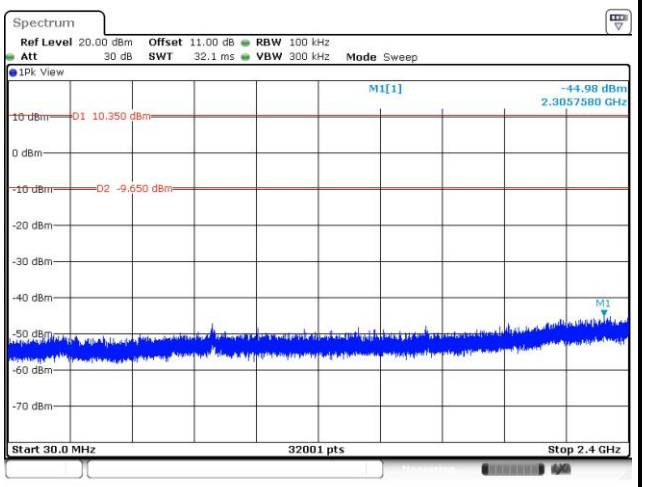
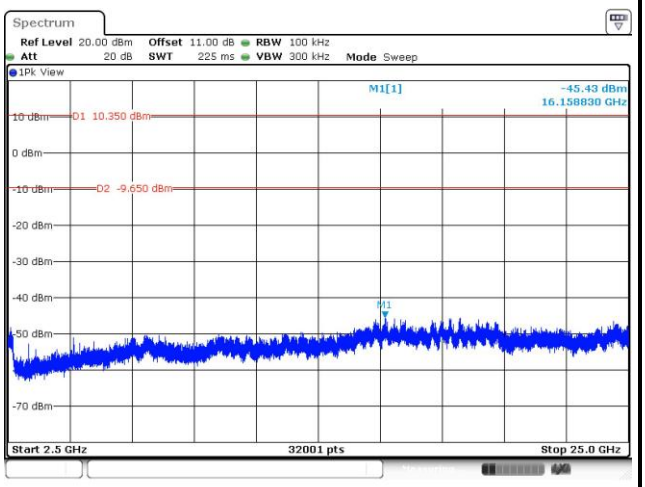
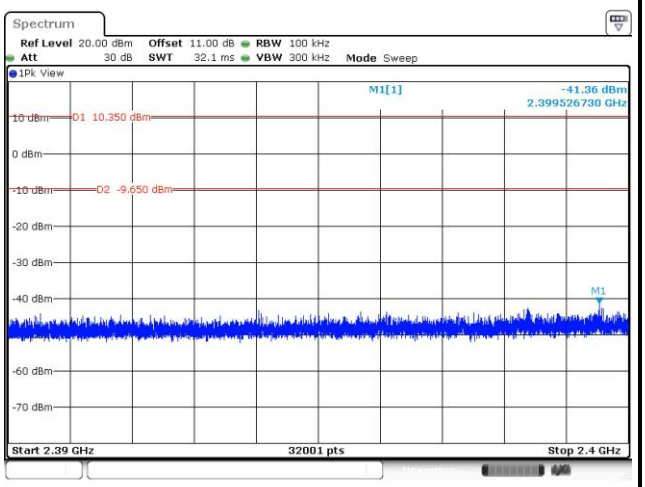
Reference Level	Tx 2412MHz / 30MHz~25GHz (down 20dBc)
	
---	
---	

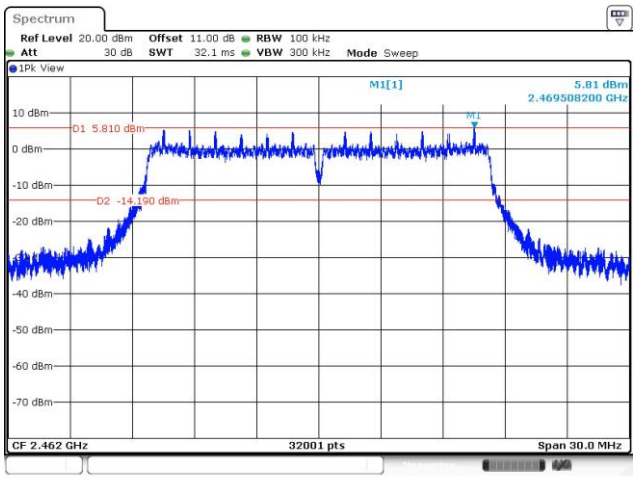
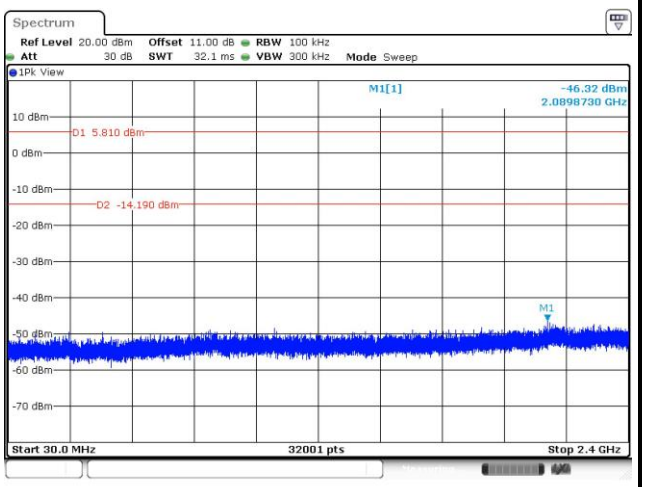
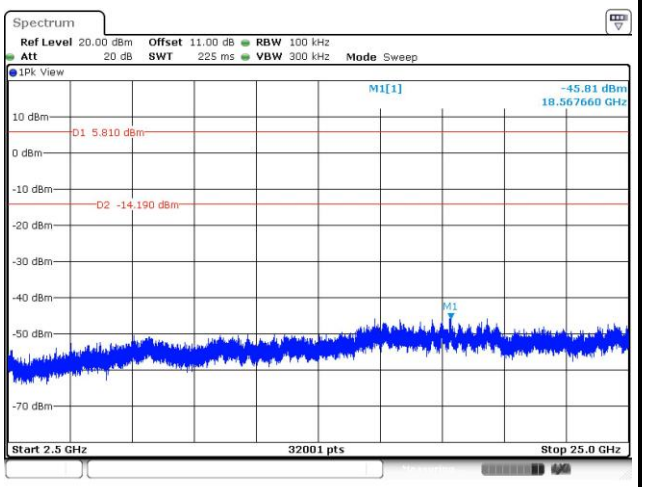
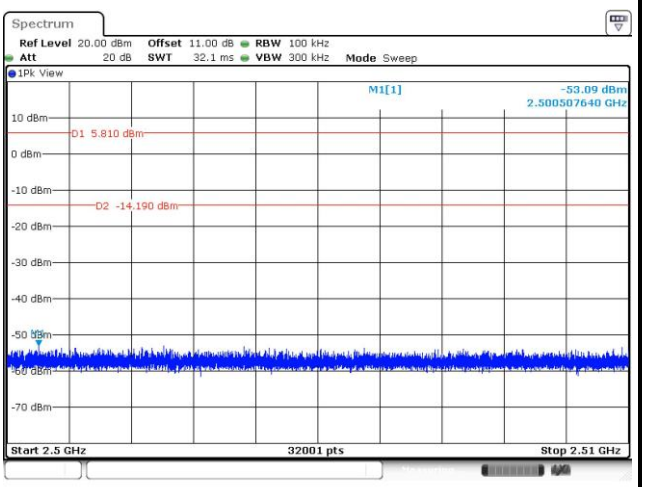
Reference Level	Tx 2437MHz / 30MHz~25GHz (down 20dBc)
	
---	
---	

Reference Level	Tx 2462MHz / 30MHz~25GHz (down 20dBc)
	
---	
---	

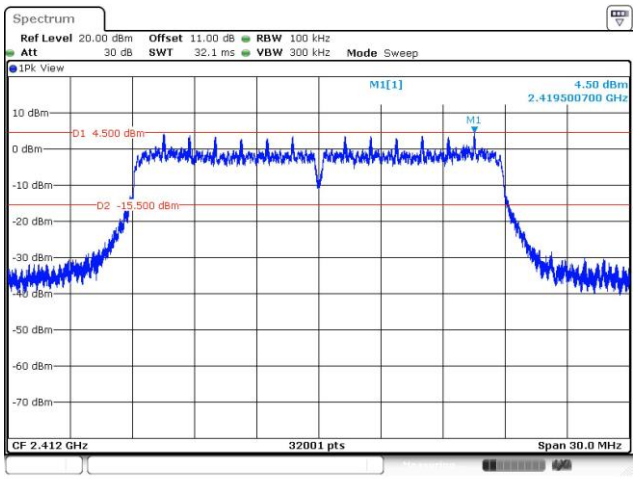
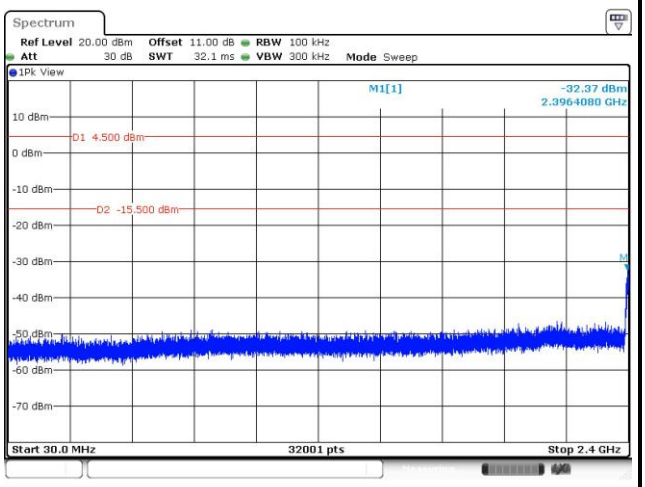
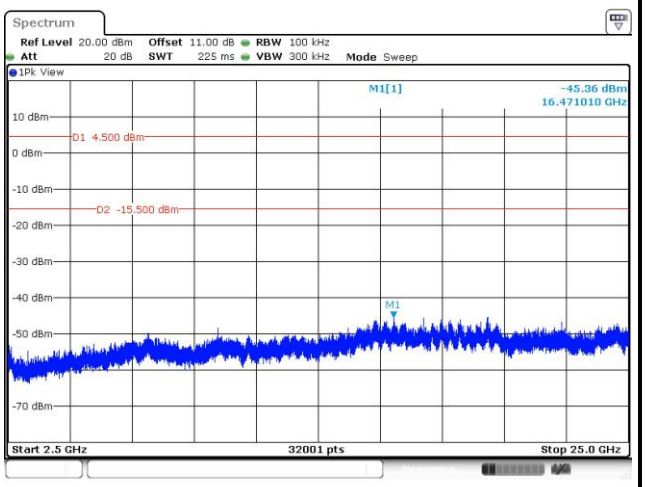
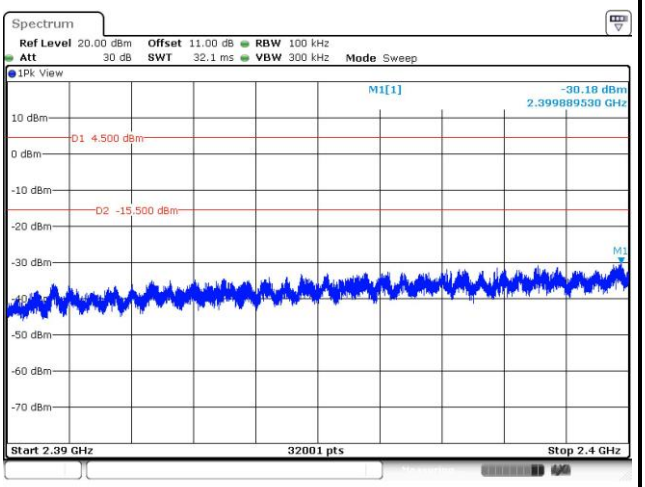
802.11g

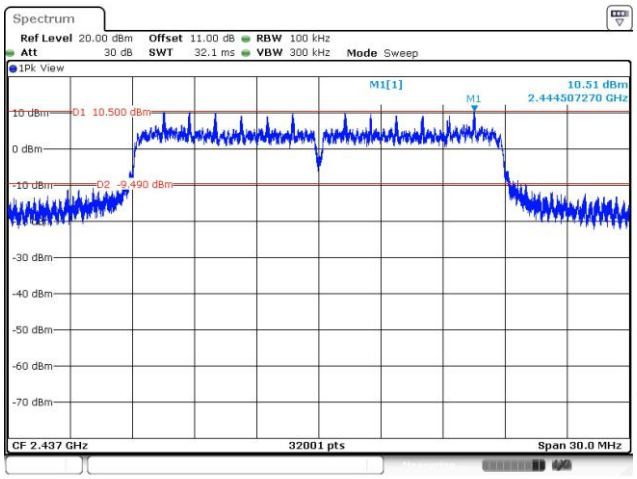
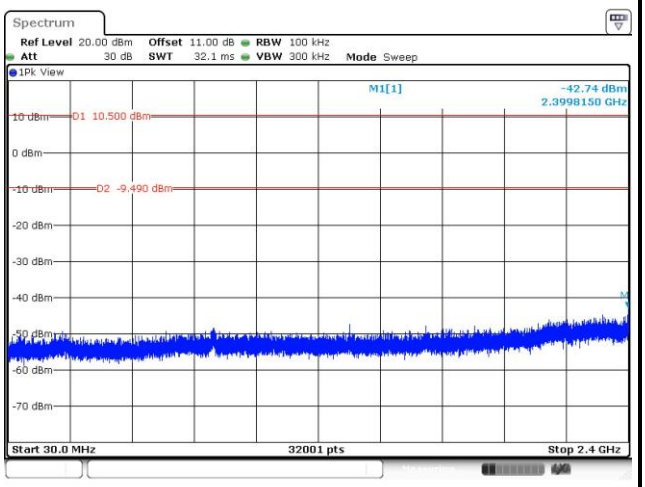
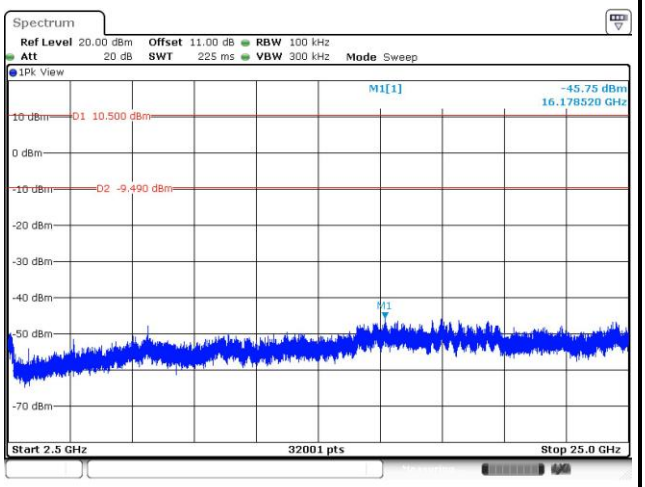
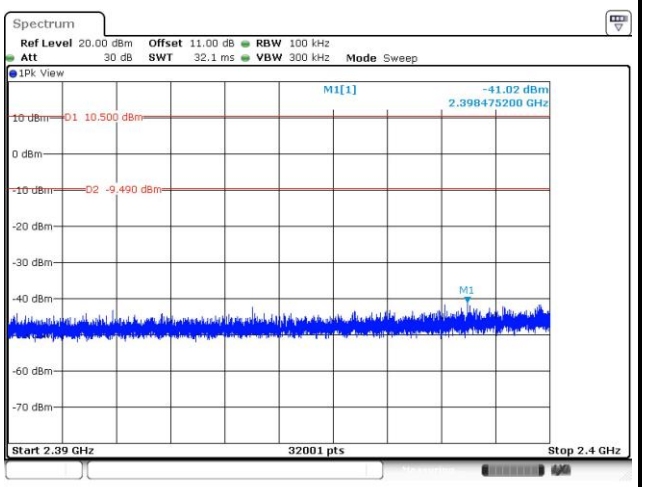
Reference Level	Tx 2412MHz / 30MHz~25GHz (down 20dBc)
	
---	
---	

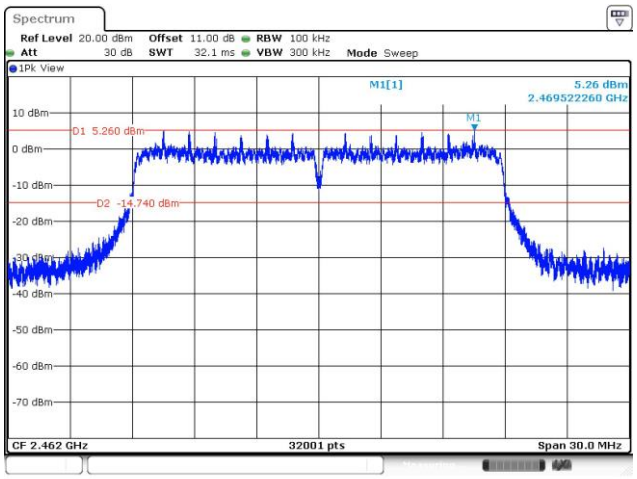
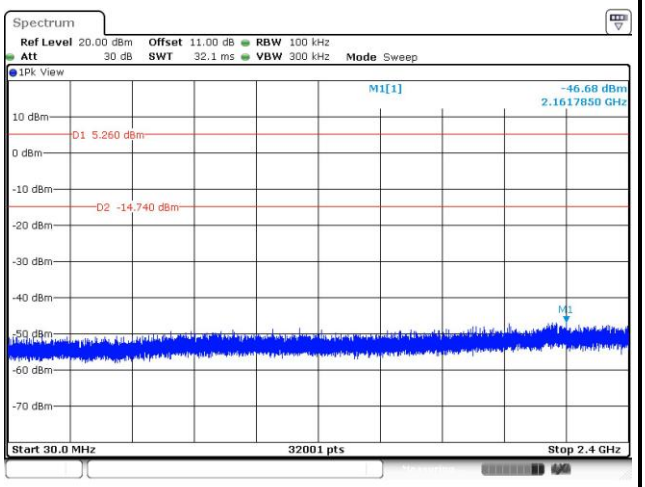
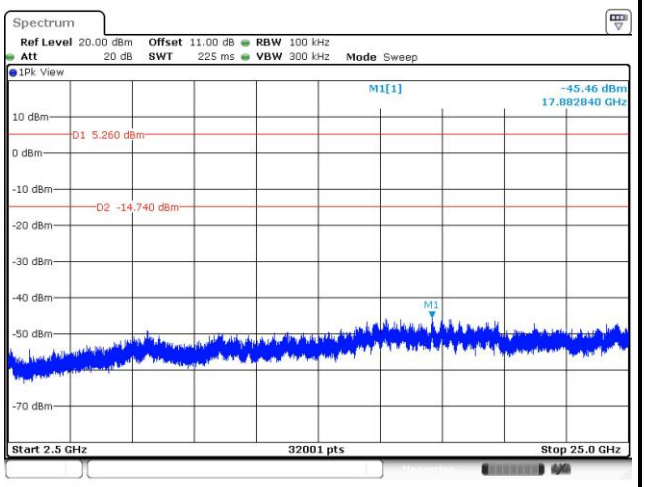
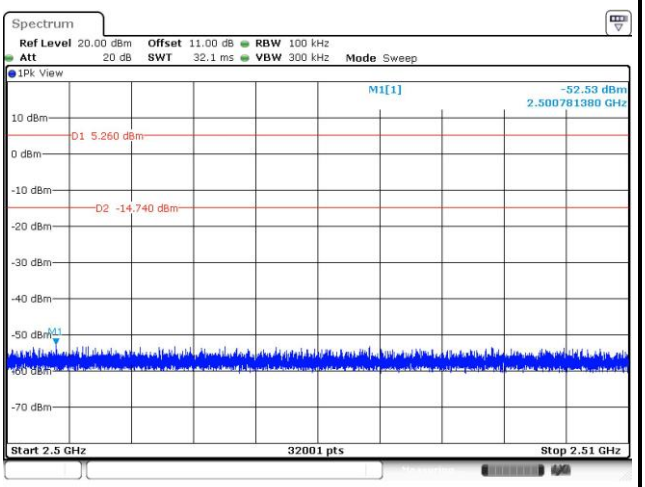
Reference Level	Tx 2437MHz / 30MHz~25GHz (down 20dBc)
	
---	
---	

Reference Level	Tx 2462MHz / 30MHz~25GHz (down 20dBc)
	
---	
---	

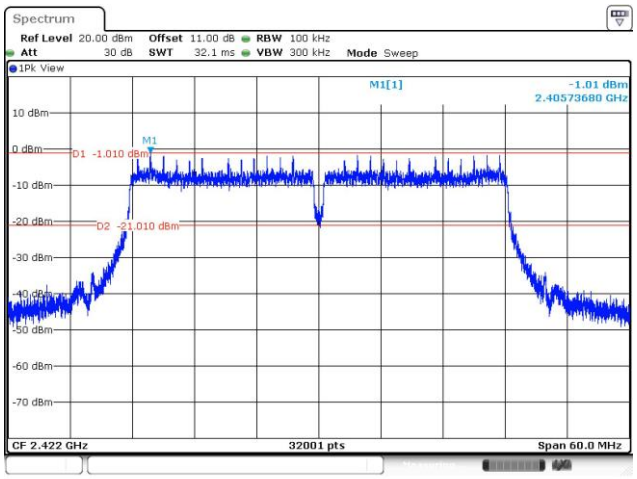
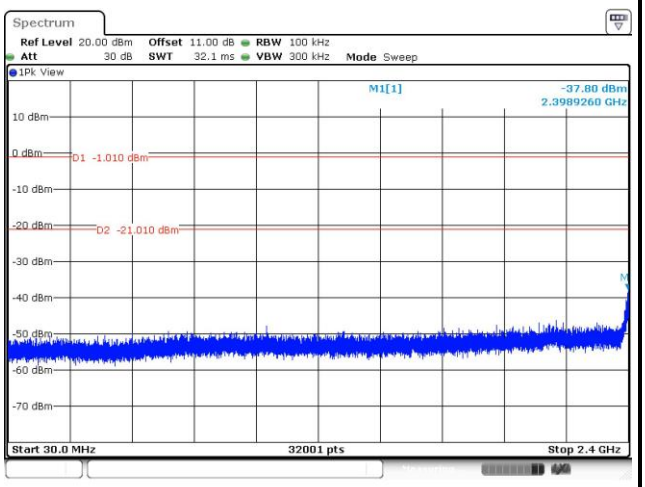
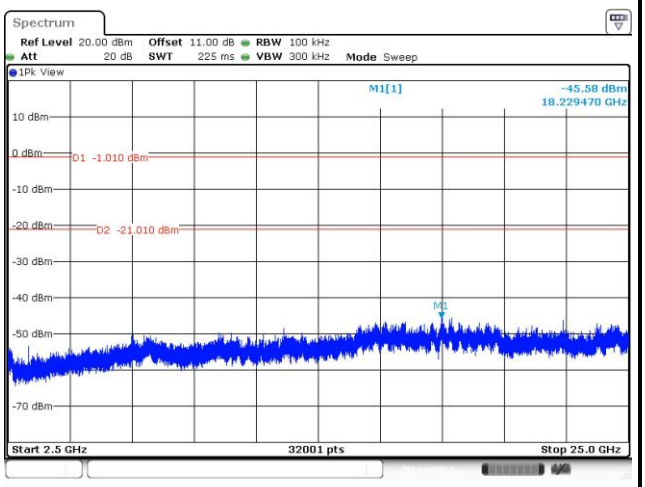
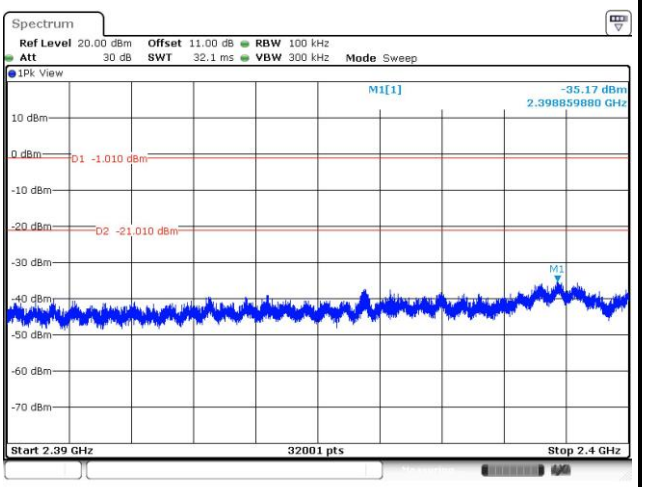
802.11n HT20

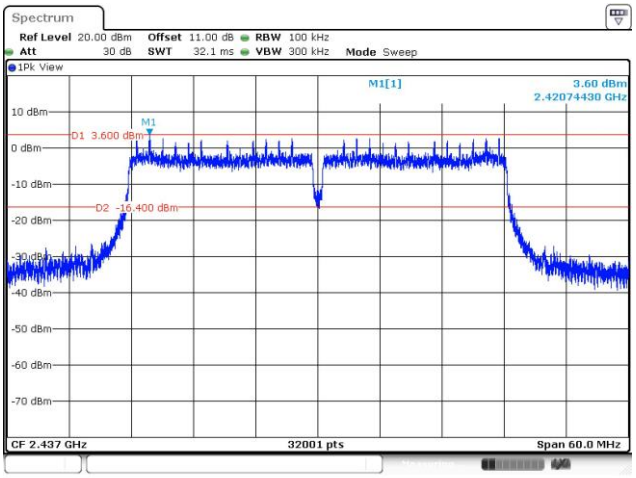
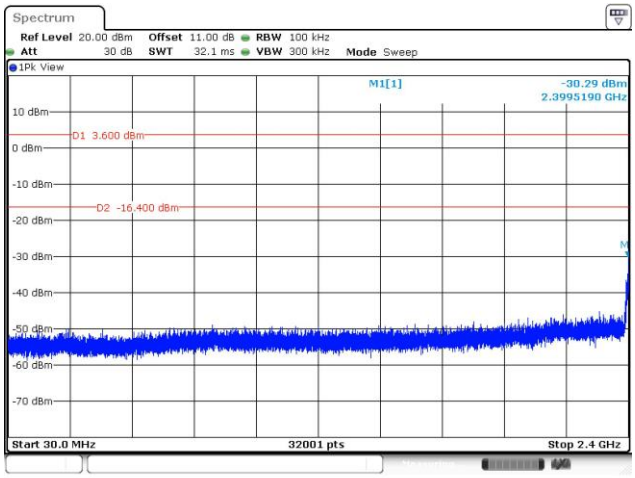
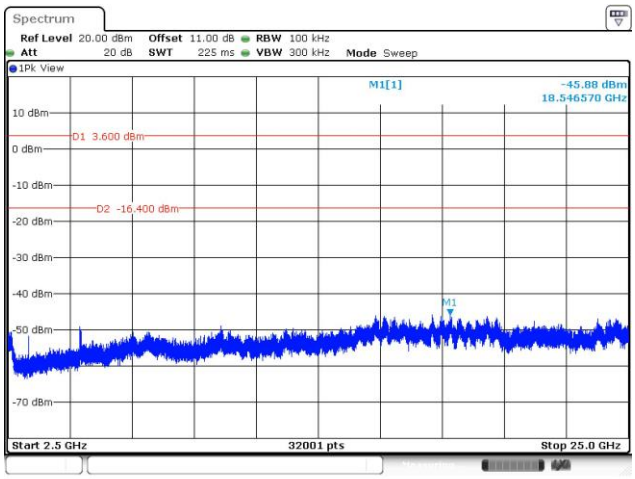
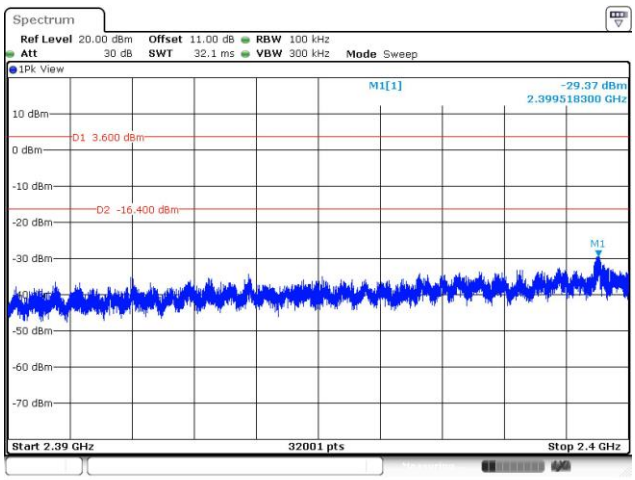
Reference Level	Tx 2412MHz / 30MHz~25GHz (down 20dBc)
	
---	
---	

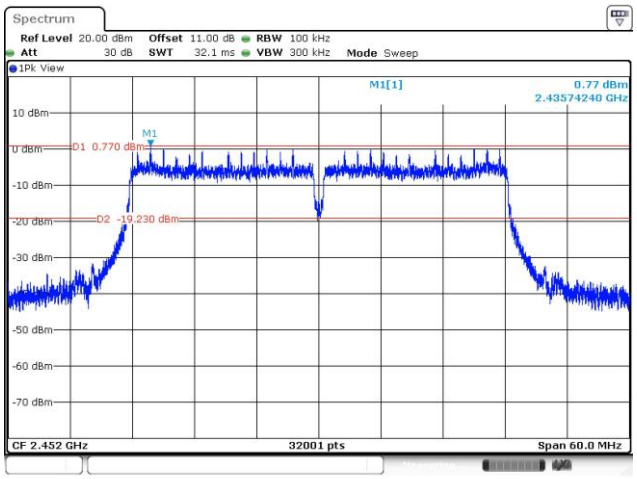
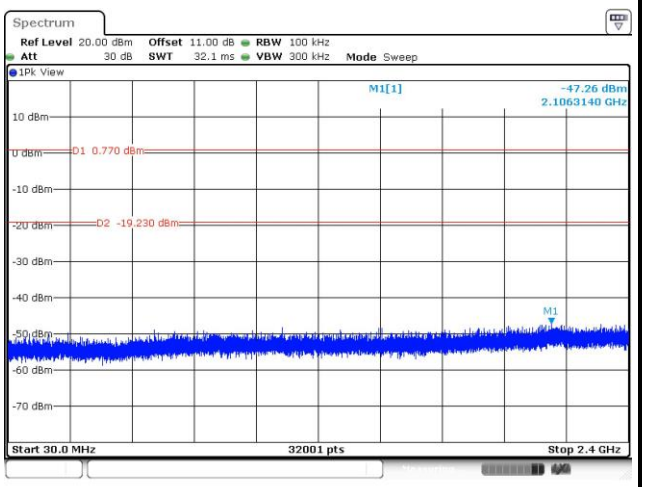
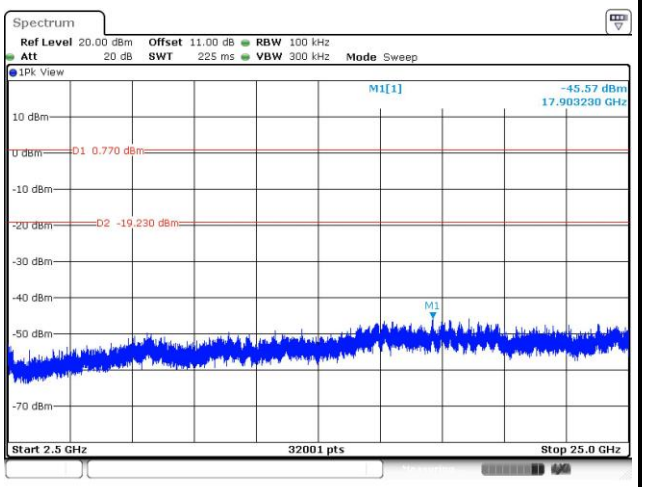
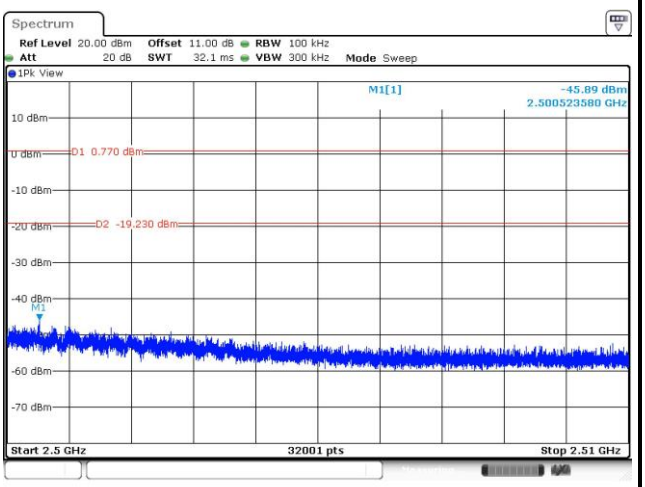
Reference Level	Tx 2437MHz / 30MHz~25GHz (down 20dBc)
	
---	
---	

Reference Level	Tx 2462MHz / 30MHz~25GHz (down 20dBc)
	
---	
---	

802.11n HT40

Reference Level	Tx 2422MHz / 30MHz~25GHz (down 20dBc)
	
---	
---	

Reference Level	Tx 2437MHz / 30MHz~25GHz (down 20dBc)
	
---	
---	

Reference Level	Tx 2452MHz / 30MHz~25GHz (down 20dBc)
	
---	
---	

4 Test laboratory information

Established in 2012, ICC provides foremost EMC & RF Testing and advisory consultation services by our skilled engineers and technicians. Our services employ a wide variety of advanced edge test equipment and one of the widest certification extents in the business.

International Certification Corp (EMC and Wireless Communication Laboratory), it is our definitive objective is to institute long term, trust-based associations with our clients. The expectation we set up with our clients is based on outstanding service, practical expertise and devotion to a certified value structure. Our passion is to grant our clients with best EMC / RF services by oriented knowledgeable and accommodating staff.

Our Test sites are located at Linkou District and Kwei Shan District. Location map can be found on our website http://www.icertifi.com.tw.

Linkou	**Kwei Shan**	**Kwei Shan Site II**
Tel: 886-2-2601-1640	Tel: 886-3-271-8666	Tel: 886-3-271-8640
No. 30-2, Ding Fwu Tsuen, Lin Kou District, New Taipei City, Taiwan, R.O.C.	No. 3-1, Lane 6, Wen San 3rd St., Kwei Shan District, Tao Yuan City 333, Taiwan, R.O.C.	No. 14-1, Lane 19, Wen San 3rd St., Kwei Shan District, Tao Yuan City 333, Taiwan, R.O.C.

If you have any suggestion, please feel free to contact us as below information.

Tel: 886-3-271-8666
Fax: 886-3-318-0155
Email: ICC_Service@icertifi.com.tw

==END==